

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING



Quit stalling

As providers tweak pricing, it's time to look hard at SNA over frame relay

By Charles Bruno

SNA users listen up: If you're not using frame relay, you're probably passing up meaty cost savings.

Market researcher Dataquest, Inc. says SNA accounts for less than 5% of all frame relay traffic, even though it makes up about 60% of all data riding over WANs. What these numbers imply

is that most of you are still wary of trusting your mission-critical SNA nets to frame relay. Well, it's time to reassess that thinking. See Frame relay, page 10

UTC's Jim Garlans replaced a "beautiful, traditional IBM multidrop network" with a 500-site frame relay net that also carries LAN traffic. "We've never lost a packet," he says.

Cabletron's Spectrum will keep tabs on service levels

By Jim Duffy

Rochester, N.H.

Cabletron Systems, Inc. plans to give its Spectrum platform a face-lift next year, taking it beyond basic management of network devices and enabling it to oversee up to hundreds of thousands of nodes.

Instead of just tracking device-level faults, Spectrum is also being aimed at service-level management, which includes the ability to ensure quality-of-service guarantees for distributed applications.

To make the product more flexible and scalable, Cabletron will embrace increasingly popu-

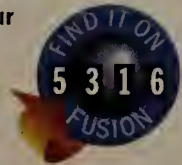
See Cabletron, page 15

We console management users with extra info online.

- Spectrum technical and mailing list info
- A network management primer
- A review of four management consoles

Enter the number to the right in the DocFinder box on the home page.

<http://www.nwfusion.com>



PETER GLASS

BBN to test RSVP

Internet service provider looking to reassure users that the 'Net is a reliable business tool.

By Denise Pappalardo

New York

Hoping to douse fears that the Internet is not reliable enough for heavy-duty business use, BBN Planet this week will announce the world's first commercial trial of RSVP by an Internet service provider.

BBN has built a trial network to demonstrate that the Resource Reservation Protocol (RSVP) can give the guarantees necessary to ensure that real-time data, as well video, audio and other multimedia elements, get through. Sources close to BBN said RSVP-based services will be available sometime in

DEFINING RSVP

The Internet's Resource Reservation Protocol (RSVP) features:

- Soft state, which enables monitoring of router information through periodic messages.
- Receiver-controlled reservation requests.
- Flexible control over sharing of reservations and forwarding of subflows.
- IP multicast for data distribution.

1997, possibly changing the way corporate America views the Internet.

The trial network was built using Cisco Systems, Inc. routers

and Cisco's Internetwork Operating System (IOS) software, which supports RSVP. The network was designed in conjunction with Cisco and content provider Worldwide Broadcasting Network, Inc. (WBN), a Cambridge, Mass.-based start-up.

The network will initially be used by WBN, but BBN will be adding other unspecified companies to test a variety of applications.

The American Stock Exchange will be the first commercial user on the trial network. WBN, a content provider that targets the financial industry, See BBN, page 14

Fall Internet World 96 Roundup

Sun, Microsoft, IBM and a host of start-ups will pile on the products at this week's show. Page 8.



Write Java applets once, run them anywhere? Not!

By Carol Sliwa and Ellen Messmer

The Java edict sounds great in theory: "Write once; run anywhere." But that's not the way applications written with the hot new programming language have been executing in practice.

Many developers have been finding that their Java applets and applications run differently on one platform than they do on another.

Even worse, they may work in Microsoft Corp.'s Web browser but not in the counterpart from Netscape Communications Corp. Or they may lock up the browser and crash the system.

"Saying you can write once, deploy anywhere is a white lie," said John Rymer, vice president of Giga Information Group. "You can write once, deploy anywhere with work."

The work is needed to cope with differing implementations of the Java Development Kit, most notably the Java Virtual Machine (JVM), the software that interprets Java code and allows it to run on various clients and servers.



"People are discovering bugs...in these browsers," says Ted Young of Advanced Web Technologies.

Problems have arisen in particular with Netscape's Java implementation of the JVM on Macintosh and Windows 95 browsers, developers reported.

From setting threading priorities to repainting the screen, developers have encountered a wide variety of difficulties.

An Austin, Texas-based software service company called Instant Sports, Inc. last spring

chose Java to create its real-time sports site on the Web using Sun's Java Workshop tool kit and has seen the problems with browsers close up.

See Java, page 68

Groups tackle ISDN diagnostic, installation woes

By Tim Greene

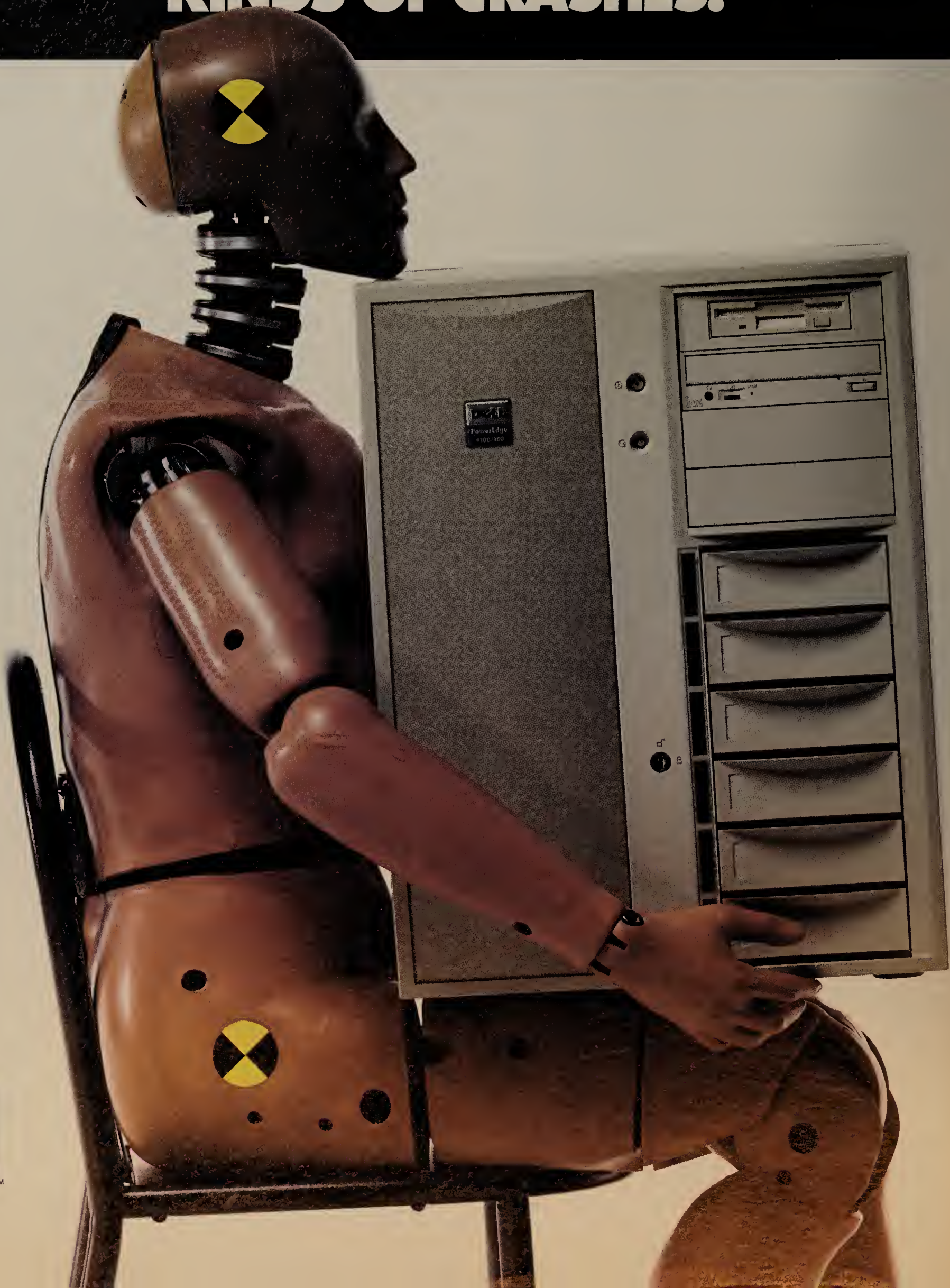
Santa Clara, Calif.

ISDN advocates are planning to pump up the often-maligned technology by solving nagging installation and deployment problems, and by letting it transport E-mail via the D channel.

On the messaging side, a low-speed packet service is being developed by equipment vendors and carriers that would let ISDN users receive their E-mail without having to dial in for it separately, thus avoiding extra per-minute usage charges.

See ISDN, page 14

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CARRIERS VS. ISPs



Which is better at providing 'Net services? MCI's Stephen Von Rump takes on PSINet's William Schrader in dueling columns. Page 57.

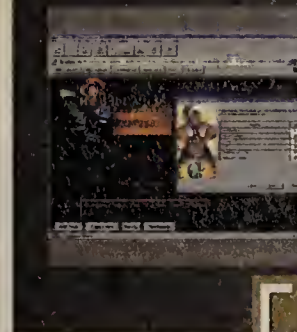
SHARKS SMELL BANYAN BLOOD

Linda Musthaler points to dire times at Banyan in the wake of its latest shake-up. Page 41.



MACROMEDIA GOES BACKSTAGE

New version of authoring tool talks database language. Page 33.



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This Week

Only on Fusion

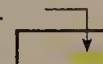
- Internet:** Moving violation or utterly ridiculous? Clonemaker Gateway 2000, which ships its wares in white boxes with black splashes, wants a Web shareware site called TUCOWS to stop using cow pictures on its pages. Read the complaint letter and graze our cow links. **DocFinder: 5317.**
 - Java:** It has its own font and graphics support, so it's now possible to use Java to deliver content over the 'Net without using HTML. Download eval copies of programs that let you do this — and read how HTML isn't going to disappear anytime soon. **DocFinder: 5318.**
- #### News+
- Internet:** Don't send your regrets — download an overview of the RSVP proposal that BBN will use to build a multimedia backbone. You can also read our series on increasing the reliability of the 'Net. **DocFinder: 5315.**
 - Management:** Get technical data on Cabletron's Spectrum; read a network management primer. **DocFinder: 5316.**
 - Wireless LANs:** Look up a comparison of their strengths and weaknesses; take a peek at a wireless LAN RFP. **DocFinder: 5302.**
 - Frame relay:** Grab primers and white papers on voice over frame relay. **DocFinder: 5304.**

NetRef

Read our Buyer's Guide to Web-ready databases (page 45), then come online for charts that let you compare the databases in a variety of categories. **DocFinder: 5311.**

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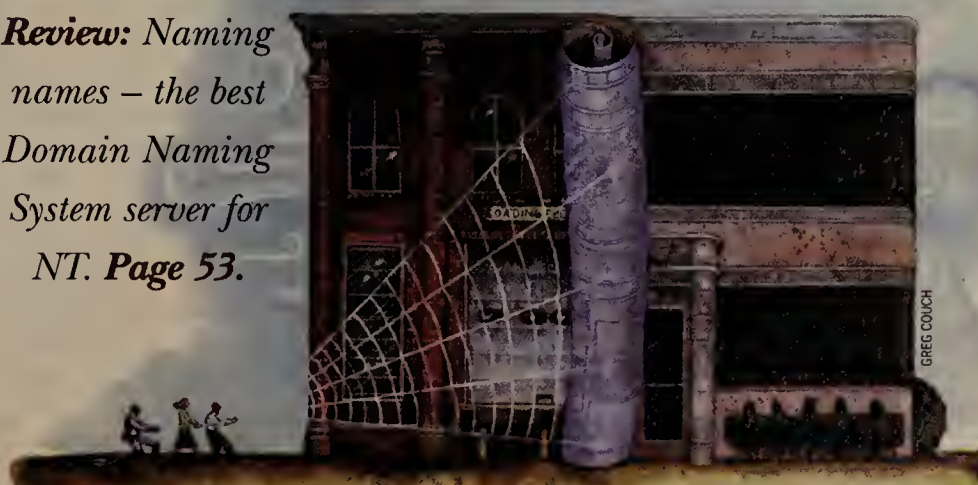
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Review: Naming names — the best Domain Naming System server for NT. Page 53.



GREG COUCH

briefs, December 9, 1996

They ought to be in pictures

Microsoft Corp. and Intel Corp. this week at Fall Internet World '96 will demonstrate videoconferencing products for the Internet based on the H.323 multimedia standard. In what company officials called the first step in bringing videoconferencing to the masses, Microsoft's NetMeeting audio and data conferencing software will now support video at approximately 5 frame/sec over the Internet. Intel is offering a new Intel Internet Video Phone, which will be able to work with NetMeeting and has the same video capabilities. Both products are available for free download from the companies' Web sites.



Domain names made easy

Nowhere's a novel idea. Network Solutions, Inc. (NSI) early next year will roll out a service enabling users to register new Internet domain names employing — you guessed it — the Internet. Users will be able to fill out forms delivered by Java-based applets from the NSI home page. Currently, the registration process relies on E-mail or fax, which has slowed NSI's ability to activate domain names, he said.

Bay optimizes Optivity

Bay Networks, Inc. last week rolled out a number of enhancements to its Optivity network management software. Optivity now allows managers to view the logical, physical and virtual topologies of frame and ATM switched internetworks based on Bay's Centillion 100 and System 5000BH architectures. Optivity also now runs under Windows NT, and can steer traffic from one or more switch ports to a monitored port on the same device. Optivity applications, available now, cost between \$3,495 and \$5,995.

UB Networks: Going, going...

Tandem Computers, Inc. expects to sell off its UB Networks, Inc. subsidiary by year-end, according to a Tandem spokesperson. Speculation is that Newbridge Networks, Inc. will be the lucky buyer, and analysts said that would make sense given that Newbridge is trying to strengthen its LAN presence. Tandem officially put UB, which makes hubs, switches and other net products, on the block in July. This is not Tandem's first attempt to sell off the struggling hub vendor; in a corporate financial report three years ago, the company revealed similar plans to cut the company loose.



We're speaking your language

Early next year, Visa International, Inc. will invite its member banks to test a new consumer bill payment application that employs speech recognition technology. The credit card organization's Visa Interactive unit has certified a speech recognition interface from Nuance Communications of Menlo Park, Calif., for the tests. Installed on a Periphonics Corp. interactive voice response unit, the Nuance BillPayer system enables consumers to phone in and state requests such as "Pay the water company \$63 on the first of the month."

Lotus makes a deal

Lotus Development Corp. last week reached an agreement with its Lotus Notes Public Network partners establishing a shared set of service criteria for Internet messaging. The specifications cover response time for outages, bandwidth capacity, equipment capacity and timeliness of adding new users. The new standards, announced at a meeting of the Multimedia Services Affiliate Forum in San Jose, Calif., will allow service providers and their corporate customers to agree on end-to-end service levels.

A good sign for VeriSign

VeriSign, Inc. last week said it has received \$30 million in private financing to expand its digital ID product line. Investments were made by Cisco Systems, Inc., Comcast Corp., First Data Corp., Microsoft Corp. and others.

Microsoft questions universal databases

Company to stick with distributed data strategy even as other firms centralize data.

By John Cox
New York

Microsoft Corp. last week outlined how its plans for SQL Server and newly introduced OLE DB interfaces provide an alternative to suddenly hot "universal" database servers.

Universal servers, which consist largely of slideware, promise to give firms unprecedented control over the vast amounts of corporate data that lie outside traditional relational databases. Universal servers, such as those from IBM and Informix Software, Inc., rely on different technologies and architectures but are similar in that they typically advocate moving data into large, central databases.

The universal servers reverse the longstanding trend toward more distributed data. But Microsoft is sticking with a highly distributed strategy.

"There is lots of data already out there in the enterprise, and most of it is not in databases," said Dan Basica, a SQL Server product manager, here at DB/Expo. What is needed is not

a universal server for data but universal access to data, he said.

Microsoft's strategy hinges on its object-based OLE DB technology, a radical redesign of its SQL Server database, and backing from third-party tools and software vendors.

DIFFERENT UNIVERSES

Microsoft is taking a more distributed approach to universal databases than other vendors.

- **Microsoft** — New OLE DB and SQL Server redesign will allow universal access to data.
- **IBM** — DB2 Universal Database handles complex data, incorporates IBM's parallel query and runs on a variety of systems.
- **Informix** — Informix Universal Server can handle complex data types as well as the usual relational database letters and numbers.

The company outlined its approach more than a year ago:

- Break SQL Server into components that are linked using the OLE DB interface.
- Let third parties add specialized components such as a program to access spatial data or VSAM files.
- Use the Distributed Common Object Model for network com-

munications, and use Falcon, the distributed transaction coordinator now in beta test, for transaction integrity across all levels. Applications or tools make an OLE DB call, directly or through the easier to use Active Data Objects interface, to the service components.

"The trick [according to Microsoft] is not to collect everything in one place and then redistribute it back out in a homogenized format," said Mitch Kramer, a consulting editor with Patricia Seybold Group, Inc., a Boston-based research company. "Rather, you leave everything in place and get it when you need it. So access is more important than aggregation."

But the Microsoft approach depends on the network in a way the Informix Universal Server approach, for example, does not. Reliability, response time and performance could be problems for Microsoft.

Microsoft's OLE DB development kit was released about a month ago. The SQL Server group is implementing OLE DB in the database, and has reworked the query optimizer and storage engine to do so. However, much work remains, Basica said. ■

CORRECTIONS

In the Nov. 18 remote LAN access servers Buyer's Guide, we did not include IPX as a protocol routed by Shiva Corp.'s LANRover Access Switch.

In the Nov. 25 issue, the prices of the two LAND-5 Corp. servers were inadvertently swapped. The 133-MHz Pentium server costs \$38,529, with a price/performance index of 784, while the 200-MHz Pentium Pro costs \$43,999, with a price/performance index of 972.

Due to an editing error, a paragraph in Scott Bradner's column (Dec. 2, page 34) was misleading. It should have read: "In any case, protecting corporate secrets (such as expansion plans) which might be worth hundreds of millions of dollars to investors or competitors with simple DES keys seems to be a real bad idea today and close to negligent in the near future."

Microsoft promotes NT, 'Net execs

By Christine Burns
Redmond, Wash.

Microsoft Corp. last week did a senior management shuffle, which included promoting its Windows NT guru into the upper echelon of executives running the company.

Under the reorganization plan, an Executive Committee has replaced the Office of the President as the company's most senior management team. Senior Vice Presidents Jim Allchin — who heads up Microsoft's Windows NT

have assumed more expanded responsibilities.

Allchin, who drove the implementation of network capabilities in Windows and Windows NT at Microsoft, will now head up the company's personal and

business systems group. This area comprises the Windows operating systems division, server application division and associated marketing.

Silverberg previously led the Internet and platform tools, as well as personal systems divisions. He will now

run the applications and Internet client group, which gives him oversight of the desktop applications division, Internet client and collaboration division, tools division, Web authoring product unit and developer relations group. ■



Senior Vice Presidents Allchin (left) and Silverberg have joined Microsoft's inner circle as the newest members of its Executive Committee.

efforts — and Brad Silverberg have joined Microsoft's current inner circle, which includes Steve Ballmer, Bill Gates, Bob Herbold, Pete Higgins, Paul Maritz, Nathan Myhrvold and Jeff Raikes.

Both Allchin and Silverberg

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Circle Reader Service #4

Holiday networking extravaganza on tap

Java start-up Random Noise debuts at Internet World amid vendor throngs.



By Ellen Messmer
and Chris Nerney
New York

At Fall Internet World '96 here this week, expect dozens of vendors — both new and old — to reveal items they hope you will add to your holiday wish list.

The show's Java and ActiveX pavilions promise to be veritable toy lands. For example, San Francisco-based start-up Random Noise will make its debut with a tool for creating and managing all-Java Web sites.

Sanga International Corp., another start-up, will announce that Corel Corp. is going to resell its Java workgroup application, Sanga Pages.

And EarthWeb, Inc., which has the premier site on the Web to showcase and sell Java applets, will announce it is expanding its mission to include JavaScript, ActiveX and Virtual Reality Modeling Language applications.

Over in the ActiveX Pavilion, Richardson, Texas-based start-up InfoSpinner, Inc. will be showing off ForeSite 2.0, a tool for integrating Windows applications, 3270 mainframe applications and SQL databases into Web sites.

Also at the conference — appearing as EbenEther Scrooge — will be Bob Metcalfe, the inventor of Ethernet. His dire prediction of the Internet's impending congestion and collapse has filled publications this year.

But Mark Bowles, product vice president at Reuters Holdings PLC subsidiary Tibco, Inc., this week will tell you that things

forcing the source to send duplicate messages. "It'll unclog the 'Net,'" Bowles said.

Tibco, a marketer of TCP/IP-based middleware for distributing stocks information and news over corporate intranets, will be joined by Cisco Systems, Inc., Reuters, Informix Software, Inc., Sun Microsystems, Inc.'s JavaSoft unit and Internet service provider Netcom On-line Communications Services in support of the multicasting protocol.

"It's a proprietary technology that Cisco and Tibco will propose to the IETF as a standard extension to multicasting," Bowles said. "Cisco will be embedding it in their operating system, and we have an agreement with Informix to incorporate this messaging into DataBlades."

JavaSoft will join the multicast merry-makers by talking about how the emerging Java Messaging Standard API for platform-independent messaging could play a role in multicasting.

The event will also mark the official debut of Pretty Good Privacy, Inc. (PGP), the Redwood Shores, Calif.-based start-up founded by mail-encryption developer Phil Zimmerman. This past fall, federal investigators finally stopped threatening to prosecute him for alleged violation of encryption export laws.

PGP will display two products: PGP Mail 4.5, a plug-in for Eudora, and PGP Web, a cookie-blocker for privacy. IBM, Digital Equipment Corp. and MCI Communications Corp. will be among the bigger names at the show looking to stuff your stockings.

IBM will demonstrate a commercial version of its Network Dispatcher clustering software, which it first used this past summer to manage traffic to and from its Olympics Web site. The software routes Web traffic among server clusters, balancing the load should one server receive too much traffic. Network Dispatcher will run on IBM

Reduced Instruction Set Computing-based SP2 clusters and RISC System/6000 servers. A platform-independent version is also in the works.

Digital is prepping three



New software from Vocal Tec allows users of the company's Internet Phone 4.0 to conduct one-on-one videoconferences.

Internet server bundles it will introduce next week. Based on the existing AlphaServer 1000A and 4100, and the new AlphaServer 300, the server bundles will include new Internet and intranet software. Few details were available, but the AlphaServer 300 will reportedly include an indexing system for all Web servers in a corporate intranet to help users keep track of datasites.

Then there's MCI, which is planning to announce enhancements to its Web hosting services. Details were not available at press time.

Electronic commerce stalwart Open Market, Inc. will use the show to demonstrate a version of its OM-Transact product used for electronic catalogs and order entry that will more easily link to back-end electronic data interchange systems.

"Before the retailer got the order off OM-Transact via See Internet World, page 14

'NET BUZZ

The latest on the Internet/intranet industry.

By Chris Nerney

ONE 'NET, MANY LANGUAGES Nothing can be more frustrating than trying to dash off an E-mail message in Arabic or Portuguese, only to find out that your operating system doesn't have the proper characters for the language. But DynaLab, Inc. of Taiwan says it has solved that problem with GlobalSurf, a multilanguage Internet/intranet and E-mail product that will be available later this month for \$99.

GlobalSurf allows users to surf the Web, as well as read and print E-mail, in 23 languages, including traditional Chinese, Czech, Danish and Dutch. Oh, yeah — English, too.

BURNING QUESTIONS Ever wonder how many jobs have been created by the Internet worldwide? Ever wonder how many people surfing the 'Net have no jobs? Well, the Global Internet Project (GIP) says it at least has an answer to the first question.

The group, comprising executives from 15 of the top Internet players and chaired by Netscape Communications Corp. Chairman Jim Clark, this week will unveil a white paper in New York that addresses the future of the Internet and its effects on commerce and society.

GIP wouldn't tell us in advance how many Internet-created jobs it has come up with. We, however, are not as proprietary about the answer to the second question: Our exclusive survey shows that a *great number** of Web surfers are layabouts on the dole.

(* 3% margin of error)

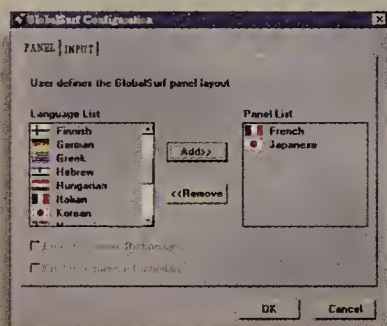
HARD WORK PAYS OFF Perhaps the above-mentioned 'Net ne'er do-wells would be wise to check out a Web-based employment database developed by Los Angeles-based start-up Interactive Search, which just snagged a \$3 million equity investment from Softbank Ventures, Inc.

SPEAKING OF INVESTMENT CAPITAL . . . NetCentric Corp. of Cambridge, Mass., is close to signing a deal that would provide it with about \$7.5 million in funding from an unidentified investor, 'Net Buzz sources say. Founded in January 1995, NetCentric develops POPware, software that runs in the Internet infrastructure.

DON'T HAVE A COW, MAN A nasty 'Net Buzz sting to computer manufacturer Gateway 2000, Inc. for threatening legal action against the owners of an Ontario-based freeware Web site called TUCOWS for allegedly infringing on Gateway's Holstein cow trademark (see story on Network World Fusion's NetFlash).

Look at these adorable cows. Sure, they might infringe upon your grazing land, but your trademark? We think not.

What 'Net Buzz wants for Christmas: Fascinating news, gossip and rumors about the hottest new Internet and intranet companies and players . . . and the Madden '97 computer football game. Contact Chris Nerney at (508) 820-7451 or cnerney@nwfw.com.



US Store Order Form

Bill To: Name: [Name], Address: [Address], City: [City], State/Zip: [State/Zip], Country: [Country], E-mail: [E-mail]

Ship To: Name: [Name], Address: [Address], City: [City], State/Zip: [State/Zip], Country: [Country], E-mail: [E-mail]

Product Description: [Product Description], Qty: [Qty], Unit Price: [Unit Price], Total Price: [Total Price]

Payment Method: [Payment Method]

Grand Total: [Grand Total]

The latest version of OM-Transact makes it easier to do EDI.

are going to get better on the 'Net. He's high on an industry effort to back an extension for subject addressing to the IETF IP multicasting protocol.

Multicasting lets routers duplicate information to be sent to several recipients, rather than

Narrative tells a lively multimedia story

Products to stream text, graphics, sounds and animation just like a CD-ROM.

By Doug Barney
Waltham, Mass.

When start-up Narrative Communications Corp. was formed last year, its ex-Lotus founders promised to liven up the Internet by streaming text, graphics, sound and animation more effectively.

Today — through a series of moves — Narrative will put its multimedia technology where its mouth is. The announcements to be made at Fall Internet World '96 will include:

- Shipment of the Enliven line, which features a free browser plug-in, a server package and a utility that translates authored files into the Enliven server format.
- Additional venture financing totalling \$5.25 million.
- A soup-to-nuts hosting service, including Internet service provider services from BBN Planet. The Enliven Hosting Services start at \$1,500 per month.
- A broad range of customers, including Sony Music Entertainment, Inc. and Time Warner, Inc., which will begin deployment this month.

Narrative's goal is to bring feature-

length multimedia, such as that in today's popular CD-ROM titles, to Internet users with low-bandwidth modem connections. The company can stream content with the same performance as a 1X CD-ROM, said Hilmi Ozguc, president and chief executive officer of Narrative. The company does not yet have technology to stream digital video.

"It works with [14.4M bit/sec and] up, and the quality of the experience does not vary. We don't drop frames or lose audio. The only thing different [from a higher speed connection] is the buffer time," Ozguc explained. With Enliven, the end user waits until enough data is downloaded to get started, and then the rest of the content streams off continuously. Other plug-ins

require that the entire file be downloaded.

The company is able to offer its streaming largely by compressing graphics and tapping the multitasking capabilities of



Enliven's streaming technology lets Ben & Jerry get up and dance.

NT Server as well as Windows 95 and NT clients.

Content providers applauded the approach. "When you are moving CD-ROM stuff to the 'Net, the problem is bandwidth. Enliven is a bridging technology," said David Cherry, technical director for Dennis Interactive, the New York-based publisher of *Blender Magazine*, a CD-ROM pop culture magazine being adapted for the Web.

"The advantage [of Enliven] is that it streams rather than waits for the full download. Once it has received the first full screen, it streams automatically," he said.

A lively mix

Enliven comes in three parts.

- The free Enliven Viewer works as a Netscape plug-in or as a Microsoft Corp. ActiveX control, and requires Windows 95 or Windows NT.
- Enliven Producer, which costs \$249, is largely aimed at translating content authored in Macromedia Director into the Enliven Server. Like the Viewer, it runs on Windows 95 or NT.
- The Windows NT-based Enliven Server, which starts at \$5,600, holds the content and streams it.

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Frame relay

Continued from page 1

"We've been dumping private lines as fast as we can and moving to frame relay," says Jim Garlans, manager of network services for United Technologies Corp. (UTC) in Hartford, Conn., and a two-year frame relay veteran. UTC has pushed out frame relay to roughly 500 sites, deploying 56K bit/sec circuits that support SNA and LAN traffic by 9.6K bit/sec SNA-only private lines — and at the same cost.

The economic picture is getting even brighter now that carriers seem to be enamored with the idea of moving SNA users from private lines to frame relay. Last month, AT&T bumped up private-line prices between 3% and 10% while simultaneously chopping frame relay rates by about 7%. And Sprint Corp. is prepping its SNA Advantage program, whereby it is inviting SNA users to trial its service for three months; if you stick with it after that, those initial three months are free (NW, Nov. 4, pages 1 and 8).

Traditional 56K/64K bit/sec private-line rates from AT&T are now \$350 per month, plus mileage charges; a comparable-speed frame relay circuit from the carrier costs \$255 per month.

Also, AT&T and MCI Communications Corp. have both announced — but not delivered — managed network services that will allow SNA shops to back-haul private-line traffic from outlying offices through their respective local loops to interexchange company central offices. At the CO, the carrier converts the SNA data for passage over frame relay circuits to the user's data center. ICI Communications, Inc. already offers such a service.

There are other compelling reasons, too, to ditch leased lines in favor of frame relay services. By aggregating multiple leased lines onto a single high-speed frame relay circuit, you reduce the number of connections to your front-end processors (FEP). That means you save on costly FEP adapters. In some cases, you may even be able to bypass a FEP altogether and connect directly to IBM 3172 controllers.

Stellar performance

Besides the economic benefits, frame relay can bring noticeable performance gains to SNA nets. Consider the case of UTC. Two years ago, the company operated what Garlans calls "a beautiful, traditional IBM multidrop network."

But it wasn't so beautiful to UTC business units, which wanted to run LAN traffic along with SNA over the wide area. Of course, they didn't want to sacrifice the 3-second response time the SNA net provided, and naturally, they didn't want to pay more.

So UTC signed up for AT&T's Inter-Span frame relay service and deployed Motorola, Inc. 6507 frame relay access devices (FRAD). And this at a time "when

people were saying you couldn't run SNA over frame relay," Garlans said.

Since then, UTC has had minimal problems. Garlans chalks that up to the Motorola FRAD. Some vendors' FRADs set up token-ring bridges over the WAN, but Motorola uses X.25 to move traffic, which Garlans says is more stable and predictable. "We've never lost a packet," he says.

A SNAPSHOT: PRIVATE LINE VS. FRAME RELAY PRICING

Line/port speed (bit/sec)	Private line	Monthly cost * Frame relay	Savings
56/64K	\$547	\$434	21%
256K	\$1,916	\$1,142	40%
512K	\$3,514	\$2,144	39%
1.544M	\$6,565	\$4,830	26%

* Rates are monthly MCI undiscounted tariff rates in effect June 1996, excluding local access. Private-line rates assume 1,000 miles between end points. Frame relay rates assume full-duplex PVC with a fixed committed information rate set at 50% of port speed.

SOURCE: GARTNER GROUP, STAMFORD, CT.

More importantly, response time is now down to less than a second. "There were a lot of people in this company who loved us when we finished [upgrading the net]," Garlans says.

Jay Pultz, a research director in the Enterprise Networks Strategies practice at Gartner Group, Inc., a Stamford, Conn.-based consultancy, says frame relay can deliver such performance gains because it eliminates the shared multidrop lines and

associated polling that occurs over WANs. Polling still occurs, but it is handled by on-premises FRADs, which spoof local devices into thinking they are being polled by a remote host to keep sessions alive.

John Coons, director and principal analyst in the Wide Area Networking group at Dataquest in San Jose, Calif., says consolidation of SNA traffic along with LAN data

and voice onto higher speed backbone circuits also helps deliver data more quickly to data centers. "You're eliminating the multidrop connections in favor of more point-to-point circuits," Coons says. "That reduces the delays in passing traffic."

Money saver

Performance, though, is often a secondary reason for moving to SNA; the economics of the service is what typically attracts new users. That was the case for First of America Bank Corp., a Kalamazoo, Mich., bank with operations in four states.

In the past, the company used at least three separate analog data lines to each branch: one for automated teller machine traffic, another for LAN data and a third for SNA. The bank typically paid \$50 to \$70 monthly for each of these 225 private lines.

Faced with private-line price increases of 18% from Ameritech Corp. earlier this

year, network planning analyst Tim Becker turned to frame relay. Now each of about 50 branches has a single frame relay link, typically 56K bit/sec, supporting all data traffic. The overall circuit cost was only about \$2,000 more per month than the old analog net.

"We averted that 18% private-line hike, and at the same time we were able to tack on additional bandwidth," Becker says.

Richman Gordman 1/2 Price Stores, Inc. of Omaha, Neb., is reaping similar benefits. The regional retailer is moving from 9.6K bit/sec dedicated lines to 56K bit/sec frame relay circuits to aggregate LAN, E-mail and SNA data from remote stores for delivery back to an Omaha data center. "If we tried to do this the traditional analog line way, we'd have likely doubled our costs," says Ned Hedrick, director of technical operations for the

retailer.

Such bank and retail applications, where there are multiple types of data to support, represent classic opportunities for frame relay, says Gartner Group's Pultz.

"Frame relay works when there's a data consolidation opportunity," he says. Frame relay becomes harder to justify on a per-drop basis, where SNA is the only traffic type running across the circuit.

"Look carefully at the traffic flows in your branch offices, and move as much of that traffic as possible to frame service," Pultz says.

Configuration check

While frame relay is a good deal financially, it does require a bit more administrative attention, Becker says. "With

Get online for more on the SNA-over-frame relay issue.

● A Tolly Group multivendor test measuring SNA performance over frame relay

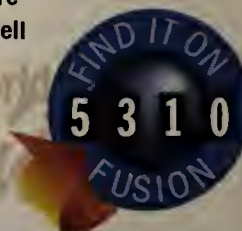
● Sync Research's collection of white papers, benchmarks and application stories

● RFC 1490, the spec defining how to ship protocols such as SNA-over-frame relay nets

● Network World stories on how AT&T, MCI and Sprint are tackling the issue, as well as a guide to selecting a FRAD

Enter the number at right in the DocFinder box on the home page.

<http://www.nwfusion.com>



frame relay, you're ordering a link from the CO to your branch location; you're not buying a full circuit," Becker says. Expect to configure your permanent virtual circuits (PVC) and define the protocols that will run over each; you'll even need to sync up the timing of your frame relay circuits with your SNA applications, he says. "We found with frame relay the delay set on our controllers had to be changed to avert time-outs."

One other bit of advice from Becker and other SNA shops that use frame relay: Order your frame relay circuits with more than a zero committed information rate (CIR). Gartner Group's Pultz cites carrier statistics that PVC route availability is 99% for zero CIR service vs. 99.9% for non-zero CIR circuits.

Becker buys frame relay with 16K bit/sec CIR levels. "We know we'll always have that bandwidth available to us, and we need it to ensure delivery of our SNA data," Becker says.

Richman Gordman's Hedrick concurs: "We decided zero CIR is a little too risky for SNA applications." ■

Why private-line bigot won't switch

Many SNA shops have good reason for eschewing frame relay and sticking with the tried and true, says Christine Heckart, vice president of broadband services at TeleChoice, Inc., a Verona, N.J., consultancy.

These organizations have spent "countless hours fine-tuning their nets to get performance to an acceptable level, and they're not about to jeopardize that to move to frame relay," Heckart says.

Additionally, many organizations have only recently begun to align the wide-area needs of SNA users with rising numbers of LAN users.

"For many years, the decision making for these two camps was totally separate; now you've got to address the immense political implications of moving to a service like frame that aggre-

gates traffic," she says. Who takes responsibility for traffic delivery? Who runs the network? Who makes the decisions? How do you ensure applications don't interfere with one another?

"For these two groups to come together and start combining traffic — even if they could get 50% or greater savings for line costs — is a stretch," Heckart says.

Still, she says frame relay makes sense if you spend a lot of time juggling multipoint lines, if your screen refresh times wallow between 5 and 15 seconds, or if you're under pressure to reduce WAN line costs. Likewise, if your organization is growing rapidly and constantly adding new sites, Heckart says, you likely would benefit from frame relay service.

— Charles Bruno



TeleChoice's Heckart says corporate politics may delay frame relay migration.

Vienna says IP voice sounds good over ATM networking

Offering provides quality and can help customers avoid toll charges.

By Tim Greene

Kanata, Ontario

Vienna Systems Corp. is pushing ATM as a way to squeeze the delay out of IP voice nets as well as to avoid off-network toll fees.

The company, which makes IP voice servers as well as gateways to public phone networks, recently completed IP voice tests over Newbridge Networks, Inc. 36150 ATM switches. While it was not surprising that test results were positive — ATM should be able to carry any IP packet successfully — the company said the results demonstrated a new way to use its products.

When run over an ATM backbone with a guaranteed quality of service, IP voice packets arrive in time to produce clear speech without delays and gaps

indicative of lost packets, Vienna said.

With the ability to make toll-quality voice calls both on and off the corporate network from desktop workstations, customers would have more incentive to move to wide-area ATM as a single network to carry both voice and data, the company said.

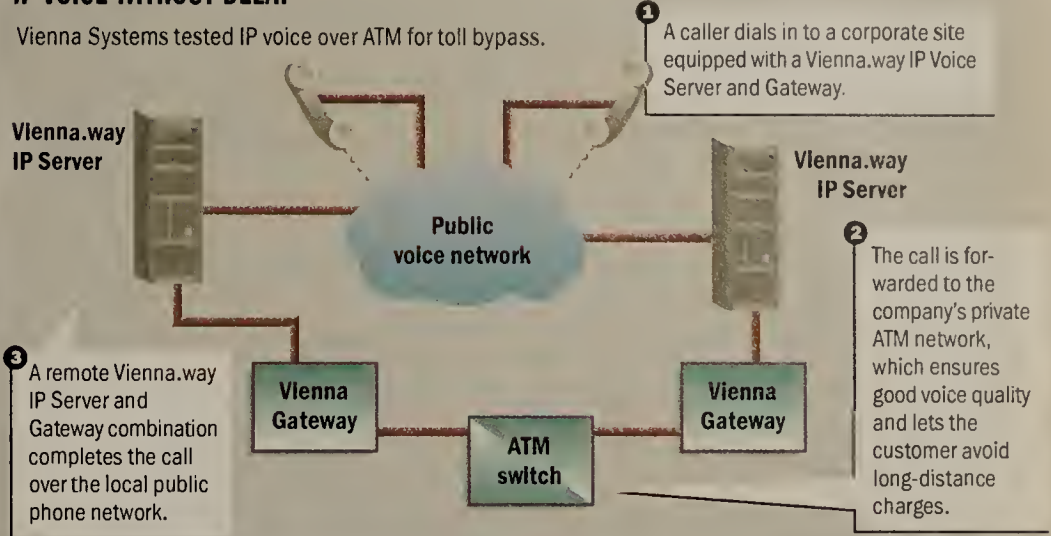
One drawback customers find in voice over IP is that while the quality is good enough to make speech understandable, it is not necessarily good enough to conduct business with someone outside the corporation. That means most customers still cannot rely on a single voice and data network.

An ATM-based IP switching network could enable customers to bypass long-distance fees for off-network voice calls.

When run over an ATM backbone with a guaranteed quality of service, IP packets arrive in time to produce clear speech without delays and gaps,
Vienna said.

IP VOICE WITHOUT DELAY

Vienna Systems tested IP voice over ATM for toll bypass.



Customers could run voice calls over ATM to the point closest to the call's destination, then dial through the local public switched telephone network to complete the call (see graphic).

Vienna said the scheme could also be used by an alternative carrier to provide long-distance service less expensively than a traditional interexchange carrier. Voice circuits cost more than data circuits, so theoretically, an alternative carrier could provision IP-based voice service over ATM inexpensively and pass along

savings to customers.

Vienna said IP voice over ATM would let customers avoid some problems of IP voice over frame relay. ATM cells are uniform in size and, therefore, predictable. Frame relay frames vary in size, and some can be long enough to noticeably delay voice traffic unless bandwidth is set aside for it.

With ATM, voice cells can be assigned a level of priority over other traffic so it is not affected adversely by delay.

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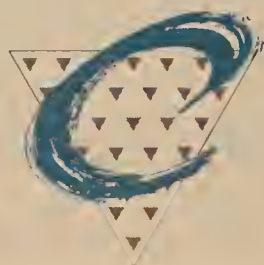
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FORE buys its way into video market

By Jodi Cohen
Pittsburgh

FORE Systems, Inc. last week loosened its purse strings to acquire ATM video vendor Nemesys Research, Ltd. for about \$16 million in stock.

The purchase will enable FORE to provide customers with a line of video encoders and decoders designed to work with its LAN and campus ATM products.

According to analysts, the acquisition makes sense because ATM customers increasingly are adding video on top of their data applications. Until now, FORE had no video offerings.

This deal marks FORE's fifth buyout. It has also purchased Alantec Corp., Applied Network Technologies, Inc., RainbowBridge Communications, Inc. and CellAccess Technology, Inc.

Separately, FORE last week rolled out the latest version of its net management software. Version 4.1 lets customers manage FORE's ATM devices, as well as the company's PowerHub LAN switch, from a single application. Previously, the 2,000 FORE customers using PowerHubs needed a separate application to manage them, according to David Colodny, Fore-

View product manager.

Version 4.1 also provides enhanced discovery and status polling features for scalability. In addition, the software can track net usage on a call basis and collect performance information.

Future enhancements — due first-quarter 1997 — include a Remote Moni-

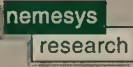
PROFILE: NEMESYS

Based: Cambridge, England

Founded: 1993

Employees: 12

Key products: ATM video network devices



toring and an RMON2 application for PowerHubs and ES-3810 Ethernet workgroup switches. In addition, FORE will roll out an enhanced virtual LAN manager and a Web-based management tool for its CellPath WAN multiplexers.

ForeView 4.1 is available on CD-ROM for both Unix and Windows NT. The versions are priced at \$9,995 and \$3,995, respectively.

©FORE: (412) 772-6600.

Ascend whips up new DSL flavor

By Tim Greene
Alameda, Calif.

Ascend Communications, Inc. last week introduced the latest Digital Subscriber Line (DSL) flavor of the month: IDSL.

ISDN DSL technology, to be offered in upgrades to Ascend gear, could deliver 128K bit/sec access to a frame relay network. Like other forms of DSL, it will do so over the same copper wires used for single-line voice telephone service.

IDSL, however, will differ from standard ISDN in one important respect: It will be a dedicated service.

That means users would pay a flat fee rather than the per-minute charges typical of ISDN, something that would be attractive to users who spend a lot of time online.

Ascend will support traditional Symmetric DSL and Asymmetric DSL (ADSL) in products by the end of February.

IDSL differs from ADSL. For one thing, its speed is a far cry from the blazing 8M bit/sec promised by asymmetric ADSL under the best of conditions.

It is also a data-only service, lacking the

analog voice line that ADSL features.

Why sell IDSL?

IDSL could be attractive to users because it can use standard ISDN customer premises equipment. This gear, which costs between \$300 and \$400, is much less expensive than ADSL gear, which runs more than \$1,000 per line and is not yet readily available.

"It's like DSL with training wheels. It gives people a chance to dip their toe in it," said Kieran Taylor, a broadband consultant with TeleChoice, Inc. in Verona, N.J.

Availability of the service is up to the carriers. Mark Gallegos, director of xDSL product development for Pacific Bell, said the service was worth considering for several reasons. IDSL would pull traffic that would otherwise tie up a voice switch and drop it onto a frame relay network which is designed to handle nailed-up permanent virtual circuits, Gallegos said.

Ascend's eight-port IDSL card for the Max 4002 and 4004 is available now for \$3,000. A 12-port card for the Max TNT will be available in March for \$4,200.

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ISDN

Continued from page 1

The Vendors' ISDN Association (VIA) and the National ISDN Council (NIC) both agreed last week to develop support for using the signaling channel in an ISDN Basic Rate Interface line to carry data.

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That 16K bit/sec channel, known as the D channel, is used now for signaling between the carrier's central office switches and customer premises equipment (CPE). But much of the time it sits idle.

It is considered ideal for carrying low-speed packet data such as E-mail, according to Jeff Fritz, network manager at the University of Virginia, which uses ISDN extensively for remote access. He said that with the overhead eaten up by ISDN protocols, throughput on the D channel could be as low as 9.6K bit/sec, but for certain applications that is acceptable. "Slow connectivity is better than no connectivity," he said.

The service that the VIA and NIC envision would let a user establish an X.25 connection to an Internet service provider over the D channel for passing along E-mail. The CPE would be configured to receive it and deliver it to a mailbox in the user's PC. It will take vendor support of X.25 in ISDN routers to bring about such services.

TROUBLE ON THE LINE

Pacific Bell reports difficulties in these areas remain common among ISDN customers:

- ▶ Configuring terminal adapters with the ISDN switch.
- ▶ Getting the full 64K bit/sec of bandwidth from each B channel because of bottlenecks between carrier switches or at PC serial ports.
- ▶ Failure of equipment vendors to include mounting cords with their gear.

While all three initiatives were approved by the two groups, they have yet to work out a timetable for accomplishing the work. That is scheduled to be established by the end of the month. "Our goal is to implement these initiatives as soon as possible," said Walt Mansell, chairman of the VIA technical committee.

The groups also agreed to tackle two of the nagging problems ISDN users still face: setting up gear to work with the ISDN switch and troubleshooting problems with the ISDN line once it is set up.

The first would be addressed by developing software that would automate ISDN installation. Under the plan, the CPE talks directly to the carrier's ISDN switch to establish which ISDN protocol the switch is using, and then configures the CPE accordingly. That configuration is now done manually and requires the user to get the switch information from the carrier and enter it in the CPE.

To work, carriers and vendors must install software in their CPE and switches that can establish the protocol. Some users say such software will be unnecessary once all switches adhere to National ISDN, a standard for ISDN that would mean all switches adhered to a single protocol.

The second problem, troubleshooting problems on a line, would be addressed by including software in the CPE that would let the ISDN switch perform diagnostics on the line as well as on the customer's gear itself. ■

Internet World

Continued from page 8



E-mail, fax or secure browser," said Cliff Ulstein, Open Market product manager. "Now we've exposed an open database API in OM-Transact so they can have the orders sent directly to EDI translators or business systems such as SAP's."

Sun Microsystems, Inc. is also expected to announce a new Web server this week.

Also at the show:

● Interse Corp. will unveil Version 3.0 of its Market Focus Web usage-tracking tool. It now includes a MetaData Module for analysis of Web-page content in more business-oriented, rather than technical, terms.

● Farallon Communications, Inc. will demonstrate Netopia Virtual Office, a software application designed to provide Windows-based Internet and intranet users with improved desktop communication between desktop computers. With Netopia Virtual Office, users can create their own Web page where visitors can leave notes, drop off and pick up documents, and even meet and collaborate in real time, said officials of the Alameda, Calif.-based company.

● VocalTec, Inc. will unveil Internet telephony software that allows videoconferencing. Internet Phone with Video 4.5 is an upgrade of the Israeli-based company's Internet Phone 4.0. Anyone who has Internet Phone 4.0 can download the video software from VocalTec's Web site for free, though users would still need a

videocamera.

● Citizen 1 Software, Inc. (C1) will debut a desktop reference for the Internet that can launch simultaneous database searches. The databases are organized into a hierarchy of file folders making the Internet look like an extension of a PC file system, C1 officials said. The San Francisco-based start-up is offering a version of Citizen 1 that can be downloaded for free from its Web site. Versions of Citizen 1 tailored for specific corporate users will be available in January for about \$800.

● GTE Internet Solutions and Microsystems Software, Inc. are slated to announce a joint marketing arrangement that will offer GTE Internet users increased filtering capabilities. Cyber Patrol offers software developed by Microsystems that filters out "objectionable" home pages at the user's or network administrator's discretion. GTE Internet users will be able to download Cyber Patrol software from GTE's home page at a discount price.

Tumbleweed Software Corp., based in Redwood City, Calif., will announce the Tumbleweed Posta server, which works on top of standard Web servers and SQL databases to send any kind of document created on the desktop over the Web by converting it into a portable document format. It then delivers the appropriate viewer or plug-in for the document when needed.

Mercury Interactive, Inc. will be unveiling a Web stress test tool for checking Web hardness.

Senior Writer Denise Pappalardo and Staff Writer John Robinson contributed to this story.

BBN

Continued from page 1



will run real-time content over BBN's network for the exchange. "WBN's service over BBN's network will let a customer like the American Stock Exchange broadcast live, real-time information from the stock floor directly to a company like Merrill Lynch or an investment house. Or they can get live news feeds into the stock exchange so traders can have up-to-the-minute information," one source said.

RSVP could also make the Internet a more stable place to transmit data. "RSVP is an enabling technology that will allow users to reserve [or request] 64K or 128K bit/sec worth of bandwidth through a series of routers," said Dan Merriman, director at Giga Information Group, a Cambridge, Mass.-based consultancy. "Potentially, this technology is very important," he said.

MCI Communications Corp. is believed to be the only other service provider involved in an RSVP trial to date. MCI is currently testing RSVP over its Switched Multimegabit Data Service network in conjunction with Cisco and Intel Corp., but it is strictly a technical trial without users, said an MCI spokeswoman.

The RSVP software is typically installed

on all the routers in a network and on the clients' TCP/IP software stack that runs on the network. RSVP runs over any IP-based routing protocol. While sources were unsure of which vendor's software stack will be used in the trial, Intel and Microsoft are the suspected choices.

RSVP on the way

RSVP is not a standard, but the Internet Engineering Task Force is working with revisions of a draft that could define a standard. The IETF is waiting to hear back from engineers who are conducting trials using the RSVP software before any final determinations can be made, said Scott Bradner, a consultant with Harvard University's Office of Information Technology.

While RSVP is not a new technology, analysts are waving a flag of caution. "RSVP is in very early stages of its rollout; there still is a lot of work that needs to be done," Merriman said. Scalability, billing and bandwidth reservation across multiple carrier networks are three areas that need to be worked out before an RSVP service can be offered, he said.

Once RSVP services are available, the demand for such services will be "relatively high in the business sector," said Fred McClimans, president at Current Analysis, a Herndon, Va.-based consultancy. ■

Cabletron

Continued from page 1

lar technologies such as Java and the Common Object Request Broker Architecture (CORBA).

The company underscored this initiative last week by acquiring privately held OASys Group, Inc., a maker of management software for Synchronous Optical Network (SONET)-based telecommunications equipment. Cabletron will add OASys' TL1/CMIP Gateway software to Spectrum to better equip the system to manage large carrier nets.

Overall, the Spectrum enhancements will benefit corporate and carrier nets alike, said Joe Massey, Cabletron director of Spectrum platform development, in an exclusive briefing with *Network World*.

"We've got a number of accounts that we're working on that need to worry about things like quality-of-service management, service-level agreements and things like that," rather than device-level management, he said.

To that end, Cabletron will add new viewing mechanisms to Spectrum that allow companies to group managed elements into "containers," which can be assigned by device, user, region or site.

The container approach will let man-

agers of very large networks monitor several similar elements at a time, without having to query each element individually, Massey said. Customers will also be able to manage the services provided by the elements, rather than monitoring the physical devices themselves, he said.

"We can start using other of our technologies to do service-level agreements and quality-of-service measurements on that container," Massey said.

"The container idea is interesting, particularly for us when we start managing other folks' networks," said Spectrum customer John Scoggin, chief technical advisor at Delmarva Power & Light Co. in Wilmington, Del. "It will be very nice to be able to break them up into chunks based on what that particular network's entitlements are."

Delmarva is delving into outsourcing by offering network management services to its power customers.

In addition to containers, Cabletron will add Java-based scripting capabilities to Spectrum next year. This will allow users to further customize the product by writing script files that automatically launch Java applets when service levels fall below expectations.

Spectrum will also support distributed CORBA objects next year, Massey said.

CORBA will let companies deploy a standard object-oriented transport mechanism that spans a variety of operating systems and takes advantage of Spectrum's proprietary object structure.

With CORBA, Spectrum customers will be able to pass objects relating to man-

A BIG YEAR FOR SPECTRUM

Cabletron plans these enhancements for 1997:

- ▶ Viewing mechanisms that group managed elements into "containers"
- ▶ Java-based scripting for customization
- ▶ CORBA-based distributed object paradigm
- ▶ Separation of existing client applications into smaller applications
- ▶ Distributed autodiscovery mechanism
- ▶ Data repository for archiving
- ▶ Accounting, inventory control and capacity planning applications for the data repository

aged devices and services more easily across a network, Massey said. "It allows for higher levels of scalability."

Also intrinsic in Cabletron's object direction is a plan to split existing Spectrum client applications into smaller distributed applications. For example, in releasing Spectrum 4.0 earlier this year, Cabletron shipped AlarmView as a stand-

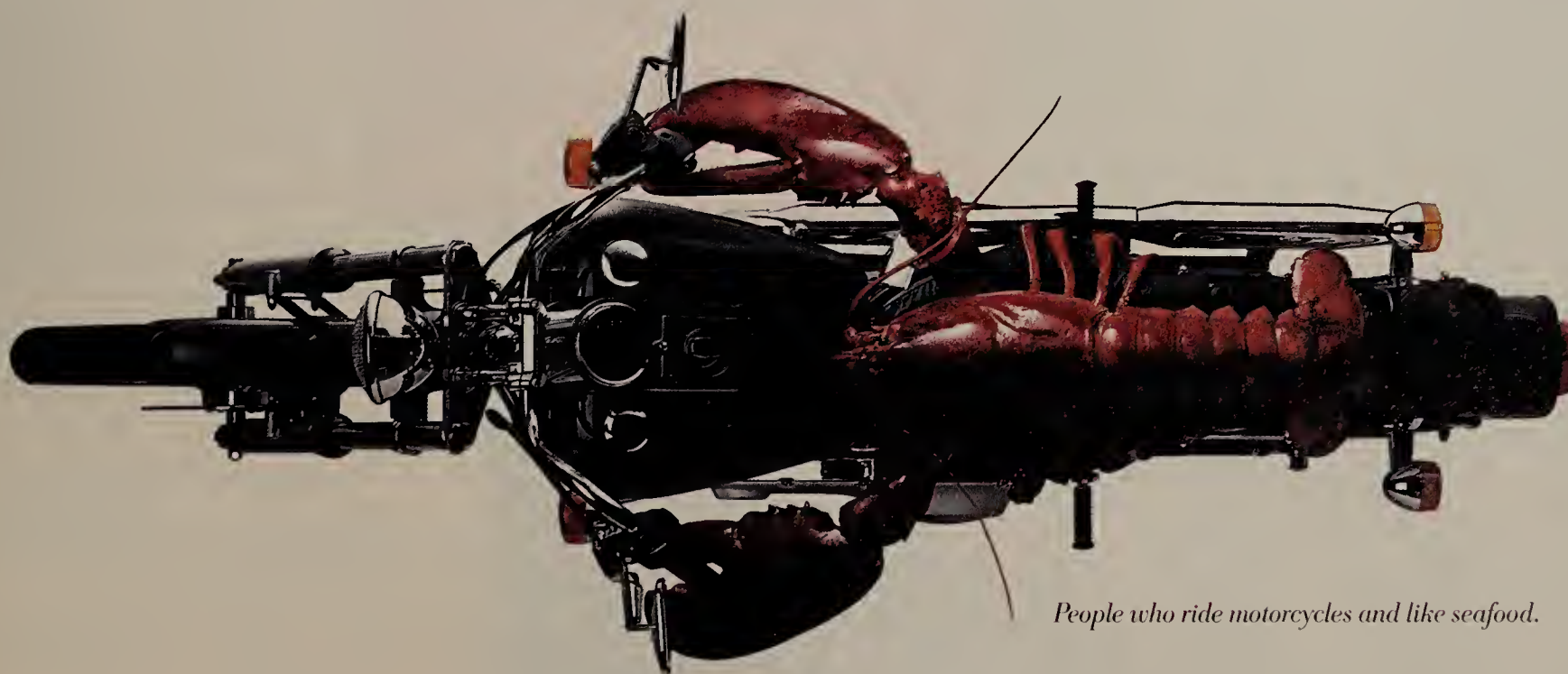
alone application instead of bundling it with other Spectrum programs.

Cabletron will continue that trend in 1997 by breaking up each SpectroGraph view into a stand-alone application. The benefit of this is users can load a single topology or alarm view onto their client, instead of a single monolithic application that may take up more memory and disk space on their management console.

"I'm interested to watch how they're going to handle licensing of these new applications," Delmarva's Scoggin said.

One such application that will be offered as a stand-alone next year is Spectrum's autodiscovery mechanism. Cabletron will enhance this application by enabling it to discover more kinds of network elements and work in a distributed fashion across multiple SpectroServers. Cabletron will also offer a lightweight version of this autodiscovery application for sale to smaller accounts that only need to discover network assets periodically.

Lastly, Cabletron will deliver on previously announced plans to develop a data repository for archiving Spectrum management information. The company will also unveil accounting, inventory control and capacity planning applications that can store and retrieve data from this repository, Massey said. ■



People who ride motorcycles and like seafood.

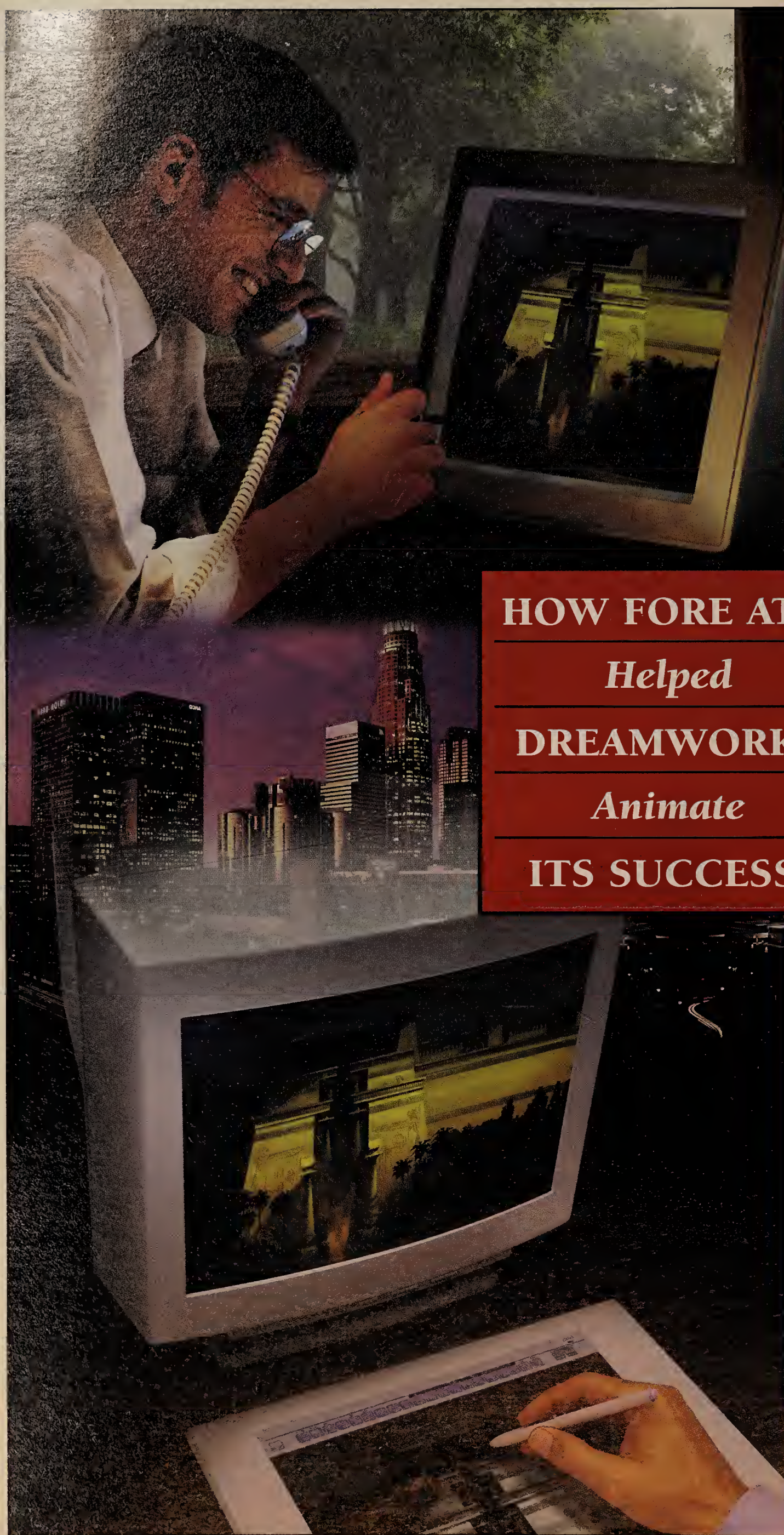
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HOW FORE ATM
Helped
DREAMWORKS
Animate
ITS SUCCESS.

"If an artist has to stop and wait for an electronic process, work slows down, and that's deadly on a movie."

That's Bill Villarreal, co-head of technology at Dreamworks SKG, explaining the challenges of applying cutting-edge technology to traditional hand-crafted animation. Dreamworks is currently producing its first animated feature, "Prince of Egypt," and Villarreal

Bill Villarreal

Co-Head of Technology
Dreamworks SKG



needed a high performance multi-service network that would connect the team of directors, animators, layout artists and producers on the picture.

"Once we decided on ATM, we looked at various vendors, and FORE had the most extensive experience. Their support and commitment to ATM were well known in the industry."

Among the countless advantages of FORE ATM for Dreamworks was "the ability to reserve bandwidth over the system so we could deliver JPEG video streams, enabling our artists to track the current state of the movie. It also means that Jeffrey Katzenberg can call it up on his desktop and monitor the film's progress."

"The impact of FORE ATM is better collaboration, greater creativity and a faster approval cycle.

As far as facilitating the process, FORE has been incredible."

FORE ATM can brighten the big picture for you, too. For a free Guide to ATM, contact us at 1-888-404-0444, info@fore.com or <http://www.fore.com>.



At the Forefront of ATM Networking

Circle Reader Service #10

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WANs & Internetworking

Covering: Network Architectures and Management • Routers • Muxes, Remote Access Gear, Modems, PBXs and other CPE • Mobile Computing Products

Briefs

■ **Apertus Technologies, Inc.** last week announced its **Java emulator** package that lets Internet users gain access to legacy 3270- and 5250-based applications. The Apertus Java software resides on an Apertus server and downloads a tn3270 or tn5250 client upon request from a workstation on a TCP/IP net. This eliminates the need to install and configure a terminal emulation package on every desktop needing SNA connectivity. The product is available for preview from the Apertus Web site at <http://www.apertus.com>.
Apertus: (800) 793-3509.

■ **Interlink Computer Sciences, Inc.** last week upgraded its MVS mainframe-based Harbor backup and storage package for Novell NetWare servers. Harbor 4.1 now can rapidly restore Novell Directory Services and automatically copy files from NetWare servers that must remain open, such as Lotus Notes, E-mail and other full-time database applications. Harbor 4.1 is available for prices starting at \$450.
Interlink: (510) 249-6125.

■ **Shiva Corp.** is betting it is worth paying to avoid the hassles of ordering ISDN. For that minimum fee, the company — which makes a variety

PROVISION PLUS SERVICE COSTS

\$30 for a loop qualification
Plus
\$79 for a Basic Rate Interface line
\$150 for a Primary Rate Interface line
\$175 for a T-1

of ISDN hardware — will take on the local phone company to initiate a line order, test that the line is provisioned correctly and go to bat for you if there are problems within the first 30 days. The Provision Plus service costs \$30 for a loop qualification, plus \$79 if it is a Basic Rate Interface line, \$150 for a Primary Rate Interface line and \$175 for a T-1. You have to buy Shiva gear to qualify.
Shiva: (888) 939-4736.

Branch office networking

Motorola and Hypercom add voice to FRADs

Companies each roll out new low-end products in effort to cut the cost of remote branch office voice calls.

By Michael Cooney
Mansfield, Mass.

New voice-over-frame relay products aimed at reducing the cost of long-distance phone calls from remote branch offices were announced last week by Motorola Network Systems Division and Hypercom Network Systems.

Motorola, Inc.'s approach was to add voice support to its low-end Vanguard 100 and 300 frame relay access devices (FRAD).

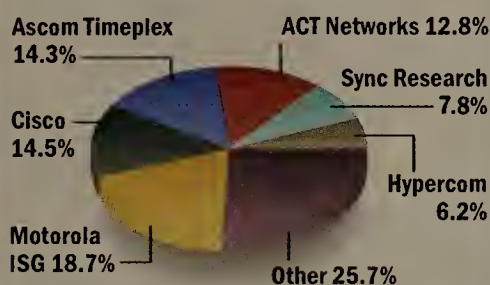
Hypercom, Inc. built voice into its Integrated Enterprise Network (IEN) family of switch/routers, giving users the ability to integrate voice, legacy SNA and LAN traffic over a single frame relay circuit.

"Voice support will eliminate the need for users to maintain multiple [permanent virtual circuits] from remote branch

offices for voice and data — essentially the voice now gets to ride that pipe for free," said Eric Larson, senior product manager for Motorola.

1995 worldwide FRAD revenues

Hypercom hopes its voice over frame relay boosts its standing in the FRAD marketplace, while Motorola hopes its support widens its leadership gap.



Based on total of \$192.6 million
SOURCE: IDC, FRAMINGHAM, MASS.

Motorola's new VoiceRelay tool for its Vanguard FRADs comes in the form of a new daughterboard and software for existing Vanguard Models 100 and 300. The VoiceRelay pack-

age provides two voice ports that can support 8K to 16K bit/sec of compressed voice traffic over multiple interfaces, including V.35, V.36 and V.24.

The Models 100 and 300 are usually tied to a larger central Motorola frame relay concentrator, such as its 6560 Multimedia Periphery Router, which passes voice on to a central site PBX and data on to its proper destination.

The VoiceRelay package is available for \$999.

Hyper for voice

Over at Hypercom, the company has added a free voice switching software module for its IEN boxes.

The software works by letting users in remote offices dial other branches by using simple access codes to specify a particular location.

The branch office IEN sends voice and data traffic to a central site IEN device, directing it as to

where to forward the call.

The IEN also supports a variety of interfaces, including voice connections from analog handsets to digital PBXs.

According to Hypercom President Paul Wallner, the company's offering is more scalable than its competitors.

"Competitive products are suitable for smaller networks, but lack the central site capacity to support voice and data switching between thousands of branches," he said.

©Motorola: (508) 261-4000;
Hypercom: (602) 548-2120.

Read up on voice over frame relay with an overview of the technology.

Enter the number to the right in the DocFinder box on the home page.

5 3 0 4

Network World Fusion

<http://www.nwfusion.com>

Service vendors enhance wares

NetSolve, Network Defenders embrace Web management.

By Jim Duffy

Two network management service providers have rolled out new offerings — one designed to enable users to view the status of problem resolution and the other to outsource performance management.

NetSolve, Inc. unveiled ProWatch Exchange, a service that gives customers real-time access to network information through a Web browser. And Network Defenders, Inc. unwrapped ProVision, a network performance reporting and optimization service.

ProWatch Exchange gives users access to databases at the NetSolve Operations Support center so they can view trouble-ticket status and history, and network installation project status. This gives users greater control

and understanding of their network, NetSolve claimed, even though the actual management is outsourced.

With ProWatch Exchange, users can view the physical, data link and network layer activity of their nets to determine if NetSolve is fulfilling the terms of its service-level contract. If not, NetSolve will refund the customer's network management fees for the month in which service-level guarantees were not met.

Today, ProWatch Exchange enables users to view trouble-tickets and performance analysis reports. In the future, the service will provide active network maps that show the status of each network location, online network availability statistics and utilization reports.

ProWatch Exchange is avail-

able now at no charge to NetSolve customers.

Defending the network

Network Defenders' ProVision leverages the company's Advanced Network Support Sys-

AT YOUR SERVICE

NetSolve's ProWatch Exchange offers:

- ▶ Web-based access to NetSolve databases
- ▶ Trouble ticket query to view problem/resolution status
- ▶ Network installation project query to view status of net expansion

Network Defenders' ProVision includes:

- ▶ Network performance management and analysis service
- ▶ Recommendations for improving performance and optimizing costs
- ▶ Network planning report generation

tem (ANSS) technology for automated performance measurement, reporting and analysis.

ANSS is a set of Windows 95 and Windows NT applications that collect SNMP, MIB2 and Remote Monitoring statistics from network devices, agents and probes.

"The concept worked better for us in terms of having a server out there collecting data constantly," said Jim Ferrato, manager of network engineering at Stream International in Westwood, Mass. "[With OpenView] it took little bit more skill to go in and configure traps and configure reports. We were constantly running out of disk space."

But ProVision still leaves room for improvement. Ferrato would like to see reports designed more for managers than for technicians.

ProVision is available now. A typical service contract for a 100-node network costs \$2,600 per month.

©NetSolve: (512) 795-3000;
Network Defenders: (508) 490-7400.

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INTERNETWORKING MONITOR

Frame relay is put to the test

Given the significant economic benefits that corporations can accrue from frame relay, it is not surprising that interest in this already established technology continues to grow.

While initially promoted by vendors as a turbocharged, simplified version of X.25, frame relay is anything but simple. In fact, some of the more interesting tests we've run over the past several years have been those with frame relay at the core.

It was with the importance and complexity of frame relay in mind that we undertook the task of producing the most demanding benchmarks yet devised for The Tolly Group's 1996 Industry Study of FRADs.

In the Oct. 14 *Network World* feature story "Framing it up right," we wrote extensively about the critical features and functions of this year's frame relay access devices. Today, the first performance results are being released.

For this study, products are being eval-

uated from ACC, Cisco Systems, Inc., Hypercom, Inc., IBM, Motorola, Inc., Netlink, Inc. and RAD Data Communications, Inc. From IBM, we've got the IBM/Proteon, Inc.-developed 2210 as well as the 2218 relabel of the Sync Research, Inc. box. Cabletron Systems, Inc. customers will be interested in looking at the offering of Netlink, Cabletron's WAN division.

As I write, final testing and checking of results is under way, so I won't comment on specific vendor results. However, they are anything but boring. You'll need to head to the Web to see for yourself.

But let me tell you about the tests you'll find when you get there.

The benchmarks fell into five groups: single-protocol throughput, multiprotocol prioritization, compression, congestion response and voice over frame relay. Some 50 separate data points were gathered for each product run through this set of benchmarks.

As anticipated, prioritization and con-



Kevin Tolly

gestion produced the most dramatic results. Frame relay's "flexible" bandwidth approach, which allows variable data rates, presents greater challenges than those faced by routers hooked up to fixed-speed ports. Traffic characteristics have a major impact on FRAD results.

In at least one test of voice over frame relay, the results were so good that our engineer dragged colleagues over to hear the voice quality. But pure voice was not

enough for us; we also ran tests to determine the impact of voice on SNA throughput and of IP traffic on voice quality.

By design, we don't choose winners from our industry studies. We believe that networking needs are too complex and diverse for that kind of approach. All in all, I think you'll find a great deal of well-organized information that will help you choose the right FRAD for your net.

Check out the results today through Network World Fusion, and let me know what you think.

Tolly is president of The Tolly Group, a strategic consulting and independent testing firm in Manasquan, N.J. He can be reached at (908) 528-3300 or via the Internet at ktolly@tolly.com.

Access the latest Tolly Group study online by entering the number to the right in the Doc-Finder box on the home page.



Network World Fusion
<http://www.nwfusion.com>

Funk adds dial-out capability

By Tim Greene

Cambridge, Mass.

Funk Software, Inc. believes that fewer modems are better. So last week, it announced upgrades to its WanderLink software that enable users to dial out through their remote access server.

WanderLink 2.2 allows authorized desktop users access to remote access server modems to, which means that each desktop need not be equipped with its own modem.

This approach reduces some of the headaches of maintaining and monitoring a lot of modems, according to Will Warren, data systems supervisor at the Alternative Public Defender office for Los Angeles County.

"It's one point of contact. You don't have to administer each PC individually," he said.

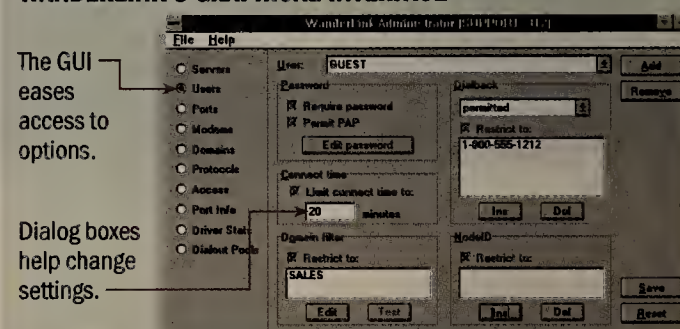
In addition to its dial-out capability, the software includes the latest version of Proxy, Funk's remote control software that lets users take over their remote PCs. WanderLink now supports IP networks in addition to its existing support of IPX.

It also supports remote control of Windows 95, Windows 3.1 and DOS PCs from a Windows 95 or 3.1 PC.

The upgrades are seen as part of the

continuing skirmish between WanderLink and Novell, Inc.'s NetWare Connect remote access suite, according to Elizabeth Rainge, an analyst at International Data Corp. in Framingham, Mass. In fact, Funk is offering users of NetWare Connect 50% off the list price if they swap out

WANDERLINK'S GRAPHICAL INTERFACE



The GUI eases access to options.

Dialog boxes help change settings.

NetWare Connect for WanderLink.

Before the new release, Funk lagged in dial-out support but continued to lead in security, Rainge said.

The dial-out support allows remote access rights to be given based on Novell Directory Services, which makes administration of those rights simpler, according to Warren.

WanderLink 2.2, available immediately, is priced at \$495 for two ports, \$795 for four ports, \$1,395 for eight ports and \$2,595 for 16 ports.

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Business Briefs

Amdahl Corp. said it will resell **Legato Systems, Inc.**'s NetWorker data backup management software under an OEM arrangement. NetWorker allows backup and restore capabilities in distributed systems environments comprising thousands of clients and servers, Amdahl said. The Amdahl version, A+NetWorker, operates on multiple platforms, including Windows NT, Solaris, HP-UX and AIX.

Lucent Technologies, Inc. has teamed with

two St. Louis-based firms — staffing specialist Maritz, Inc. and facilities design firm Hellmuth, Obata & Kassabaum, Inc. — to create a **turnkey call center package**.

Lucent will contribute its automatic call distributors and call center software to the package. In addition, the company will act as the technology project manager for users that pick the three-way partnership to build and staff call centers.

O u r f l u i d l i c e n s i n g TM
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Switzerland, our high speed connectivity and partnership with Unisource make Swiss Telecom your gateway to business centers throughout Europe and beyond.

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quickly and efficiently to your questions and concerns.

So, if you're looking for a network that gets right to the point, call Swiss Telecom at 1-800-966-1145 for more information.

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Networks that run like clockwork.

Carrier Services

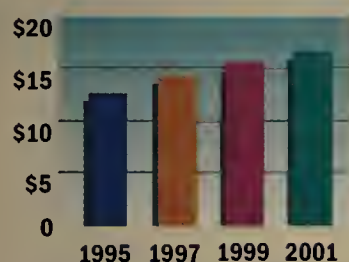
Covering: Local and Long-Distance Services • Value-Added Networks • Cable, Satellite and Wireless Networks • Regulatory Affairs • Carrier-Based Internet Services

Briefs

■ **Private-line usage will continue to grow over the next five years despite the boom in frame relay, according to a new study by market watcher Insight Research Corp. in Livingston, N.J. While frame relay is more cost-efficient for bursty traffic,**

U.S. PRIVATE-LINE REVENUE

(In billions)



SOURCE: INSIGHT RESEARCH, LIVINGSTON, N.J.

users still prize private lines for "near 100% availability at specified throughput and latency levels, a promise frame relay cannot yet make," the study said.

■ **British Telecommunications plc** and its pending merger partner, **MCI Communications Corp.**, recently announced a **transatlantic ATM test network** dubbed *Pilot CellStream*. Netcom Internet Ltd., the U.K. subsidiary of Netcom On-line Communications Services, Inc., will migrate its transatlantic traffic to the CellStream network this month. The international ATM service is slated for availability in mid-1997.

Separately, **BT and MCI** last week officially filed their **merger application** with the Federal Communications Commission, which must OK the deal. The application trumpeted the openness of the British telecom market.

■ **Frontier Corp.** recently started offering **local exchange services in New York City** as a cocarrier. The company has its own switch there to route traffic and is also reselling NYNEX Corp. services. It bundles local service with long-distance, toll-free, cellular, paging and calling card services.

Faster frame relay

MCI T-1 bundles give frame relay more power

Inverse multiplexing isn't just for ATM anymore.

By Denise Pappalardo

Washington, D.C.

MCI Communications Corp. is enhancing its HyperStream Frame Relay service this week by letting network managers incrementally increase the speed of their service.

The enhancement will let users inverse multiplex as many as eight T-1 connections for up to 12.288M bit/sec of bandwidth.

Frame relay services typically peak at 1.544M bit/sec. But using a Digital Link 3800 inverse multiplexer, a network manager can now add two to eight T-1 frame relay connections protecting their investment in the packet-based technology, said Todd Bahner, marketing manager for MCI's HyperStream Frame Relay service.

Users will have to make an additional investment in the Digital Link multiplexer, but Bahner said that cost will be incidental compared to switching to another technology, such as ATM. Switching to ATM would involve a large investment in new equipment, training and may prove unnecessary — especially if the network is used mainly for data traffic, Bahner said.

Because there are no standards for frame relay inverse multiplexing, network managers will be limited to using Digital Link's 3800 multiplexer, at least initially. MCI can provide the device for a monthly fee or users can purchase a 3800 outright.

MCI filed a tariff with the Federal Communications Commission late last week to ensure the prices would be in effect for the service rollout this week. The enhanced service will also fall under MCI's service-level guarantee offering.

While some carriers (such as LDDS WorldCom) offer T-3, 45M bit/sec frame relay service, MCI's service lets users gradually

add bandwidth as needed.

"Other carriers offer high-speed frame relay access on an [individual case basis], but none offers tariff rates," said Tom Jenkins, broadband consultant at Telechoice, a Verona, N.J.-based consultancy.

"MCI is ahead of the pack," he said.

Another migration path MCI will soon implement for its customers is frame relay to ATM interworking. Interworking is ideal for users that have bandwidth requirements that exceed 12M bit/sec, said Melanie Hansen, senior manager enterprise

INVERSE MULTIPLEXING FOR FRAME RELAY

MCI is rolling out high-speed access to its frame relay service that will let users inverse multiplex up to eight T-1 connections. HyperStream frame relay speeds will range from below 1.544M to 12.288M bit/sec. The inverse multiplexing capability lets users incrementally add bandwidth.

Number of T-1s	Network ports (M bit/sec)	Network port cost
2	3.072	\$2,268
3	4.608	\$2,768
4	6.144	\$3,268
5	7.680	\$3,768
6	9.216	\$4,268
7	10.752	\$4,768
8	12.288	\$5,268

network marketing at MCI.

Interworking will let network managers use ATM at large sites while continuing to use frame relay at smaller, branch office sites.

MCI is in the process of testing equipment now to support interworking and expects the service to be rolled out in mid-

1997, according to Hansen.

MCI also plans to further integrate its billing system by adding frame relay service to the billing package.

"This is a top priority for us in '97," Hansen said. Users will be able to reach their contract minute requirements with both voice and data services. ■

New phone-number administrator will be busy

By David Rohde

Washington, D.C.

If all goes according to schedule, a new administrator of telephone numbers in the U.S., Canada and the Caribbean will be selected by next April Fool's Day.

A QUICK DECISION

Timeline for choosing the new administrator of telephone numbers to replace Bellcore:

Request for proposals issued:

Jan. 14, 1997

Proposals due:

Feb. 14, 1997

Winner recommended by FCC-appointed panel:

April 1, 1997

Final approval by the FCC would be expected shortly thereafter.

Whoever it is, it will have its hands full on Day One.

The new North American Numbering Council (NANC), a 34-member group appointed by the Federal Communications Commission, last week met here to hash out requirements for its

request for proposal for a new number administrator.

Under the Telecommunications Act of 1996, NANC — dubbed "Nancy" by its members — must pick a numbering administrator to replace Bellcore, which asked several years ago to be relieved of the assignment, and Bellcore is expected to be sold to Science Applications International Corp.

The Bellcore replacement must not be affiliated with any specific segment of the telecommunications industry, such as the regional Bell operating companies that now own Bellcore.

Commercial IT organizations with high-powered database capabilities are expected to be among the bidders, since one of the administrator's key roles will be to coordinate massive databases of local and 800 numbers that users will be able to retain when they change carriers.

While the FCC mandated local number portability throughout the country by Dec. 31, 1998, the new administrator

is likely to have to wade through many disputes over its implementation. Just last month, US WEST, Inc. sued the FCC over its ruling, complaining that the FCC's approved method of local number portability will cost it too much money.

The RBOC's action drew criticism from many other carriers, which noted that when the FCC issued its rules in July, it requested further comment on ways for carriers to recover their costs.

But those comments have sharply split the telecom industry, with most long-distance carriers and competitive access providers saying each carrier should pay its own costs and most RBOCs asking that its costs be shared with others carriers.

NANC member Peter Gugina, director of technical standards management for MCI Communications Corp., also expressed concern that many of the industry's existing rules for resolving numbering disputes are vague and should be tightened up to make the new administrator's job clearer. ■



States stick to FCC interconnection rules

By David Rohde
Washington, D.C.

Federal rules on interconnecting competitors' local networks may be held up in court, but some states are approving interconnection agreements as if they were still

in effect. And some of the regional Bell operating companies aren't very happy.

The Federal Communications Commission's disputed rules say that new local exchange carriers — such as long-distance companies yearning to enter the

local business — should be able to buy RBOC services at wholesale discounts of 17% to 25% for possible resale.

Although a federal appeals court suspended the FCC rules, most of the states that have ruled on wholesale discounts have gone along with the FCC guidelines.

For example, the Minnesota Public Utilities Commission recently ruled that

AT&T and MCI Communications Corp. are entitled to a 21.5% discount off the retail cost of services offered by US WEST, Inc. The Minnesota agency also said that MFS Communications Company, Inc. the competitive access provider due to be acquired by LDDS WorldCom, should get a 21% discount.

Likewise, the Virginia State Corporation Commission set a 21.3% discount for AT&T and MCI to resell Bell Atlantic Corp. services. And in California and New York, regulators have set discounts within the FCC range for all RBOC territories, although they gave a break to non-RBOC local exchange powerhouse GTE Corp. (see graphic).

Bell Atlantic and US WEST immediately protested to the state commissions involved. US WEST vowed to fight the Minnesota ruling "on every possible front."

I can get it for you wholesale

AT&T is entitled to the following wholesale discounts off selected carriers' business retail rates, under completed state arbitrations:

State	Local carrier	Resale discount
New York	NYNEX	21.7%*
	Rochester Telephone	19.6%*
California	Pacific Bell	17%
	GTE	12%

*New York discounts are 2.6 percentage points less if AT&T does not provide its own local operator services.

SOURCES: STATE PUBLIC UTILITY COMMISSIONS

Contributing to US WEST's ire was a separate part of the Minnesota ruling that set prices for new competitors wanting to purchase only pieces of the US WEST network and combine them with their own local facilities. The Minnesota commission set prices for those so-called unbundled network elements at rates as much as two-thirds below where US WEST wanted them.

Analysts cautioned that the states' actions do not necessarily mean that local competition is about to break out around the country for several reasons:

- Some of the state rulings are predicated on a requirement that new local competitors offer their own operator services. If they don't, their resale discounts are less.
- Some key states have not completed their actions. For example, despite setting resale discounts, the New York commission will not set prices for unbundled network elements until next year.
- Some states are giving RBOCs leeway on nonpricing issues. The Illinois Commerce Commission, in settling an interconnection dispute between AT&T and Ameritech Corp., ruled that Ameritech does not have to provide AT&T with customer credit and payment histories, and does not have to list AT&T customers in its Yellow Pages.

Senior Writer Tim Greene contributed to this story.

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- ☐ OEM
- ☐ Reseller/VAR

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project planned? (check one only)

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- ☐ 4 to 6 months
- ☐ 7 to 12 months
- ☐ 12+ months

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(check one only)

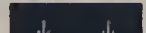
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- ☐ CCO/CIO/VP of IS/MIS

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- ☐ IS/MIS Applications/Development
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What is your job level?
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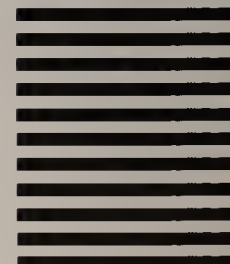
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Briefs

■ **Data General Corp.** is adding three **Pentium Pro-powered departmental servers** to its **Avion** line. The **AV1600** features a 200-MHz processor, 256K bytes of cache and up to 512M bytes of ECC memory. Pricing starts at \$3,900. The



AV2600 tower, similar in processing power and cache to the AV1600, features redundant power supplies and cooling, and supports RAID Levels 0, 1 and 5 with up to 10 hot-swappable disks. Pricing starts at \$8,100. The AV3600R can be configured with up to three quad-processor Avion systems in a single cabinet. Pricing starts at \$13,300.

Data General: (508) 898-5000.

■ **Cheyenne Software, Inc.**, now a division of Computer Associates International, Inc. (CA), last week acquired **Preferred Systems, Inc. (PSI)**, a directory services management vendor in West Haven, Conn. PSI's Directory Services Management products for NetWare and Windows NT will be added to CA's Enterprise Management product group. CA acquired Cheyenne in October to beef up its offerings with a data storage management product for desktops and LAN workgroups.

Cheyenne: (516) 465-4000;
PSI: (800) 222-7638.

■ **Novell, Inc.** last week released a set of tools that make it easier for users of Microsoft Corp.'s LAN Manager and IBM's LAN Server to upgrade to either **NetWare 4.X or IntranetWare**. The **Novell Consulting Toolkit** includes tools that migrate existing domain objects, file system data and access rights into Novell Directory Services. The tool kit is downloadable via Novell's Web site (<http://www.novell.com/toolkit>).

Novell: (800) 453-1267.

IBM officials still standing behind OS/2

Internet enhancements on tap in the next 18 months for server and desktop versions.

By Christine Burns

Despite a barrage of industry speculation that IBM is not putting its full weight behind OS/2 Warp, company officials say they are forging ahead with plans to enhance desktop and server renditions over the next 18 months.

While scarce on detail, IBM

confirmed it is prepping several browser and Java-based improvements to the OS/2 Warp desktop to make it a better Internet client and an appropriate operating system for up-and-coming network computers.

For the server, IBM will make several Internet-related enhancements geared at bringing OS/2 Warp Server 4.0 more in line with competing network operating systems.

"Our large customers have invested heavily in OS/2, and we will protect those investments by giving OS/2 the pieces it needs to function over the Internet and in the new network computing paradigm," said John Albee, brand manager for OS/2 Warp Server with IBM's Personal Software Products Division. All enhancements will be rolled out as add-ons, with no major alteration to the OS/2 kernel expected until 1998, he said.

On the desktop, OS/2 Warp users can move away from the little-known IBM Web browser that comes bundled with the operating system and adopt Netscape Communications Corp.'s Navigator. The first OS/2 Warp version of this popular browser is in beta and will ship later this month.

IBM will enhance its cli-

ent-side Java support with the inclusion of Java 1.0.2, which improves security and speeds application performance by as much as 40% over the current Java implementation, Albee said.

Java support will let customers who purchased OS/2 because it was the first to offer multitasking and other advanced features open up their environments to applications not previously available to them, said Buck Bohac, president of Indelible Blue, Inc., a large reseller in Raleigh, N.C.

"If the industry can keep Java standard, one more Java application is one more OS/2 application," he said.

For OS/2 Wrap Server, customers can expect more browser-based administration tools, better TCP/IP connectivity and support for various network computing protocols. IBM will improve the software's Internet support in 1997, enhancing its electronic commerce and Web server capabilities, as well as rolling out proxy server and firewall features.

IBM is also expected to add server-side support for Java 1.0.2 sometime in the first half of next year. ■

Management tool targets mixed NT and NetWare environments

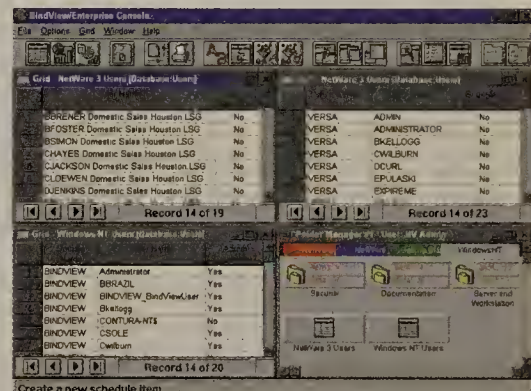
By John Robinson
Houston

BindView Development Corp. is warming up to Windows NT with support for the network operating system in its enterprise network management tool.

The company has long talked about its Enterprise Management System (EMS) as a framework for managing multiple platforms, but until now has only supported NetWare. The company hopes to attract NetWare customers migrating to Windows NT who want to manage both NOS environments

one common console.

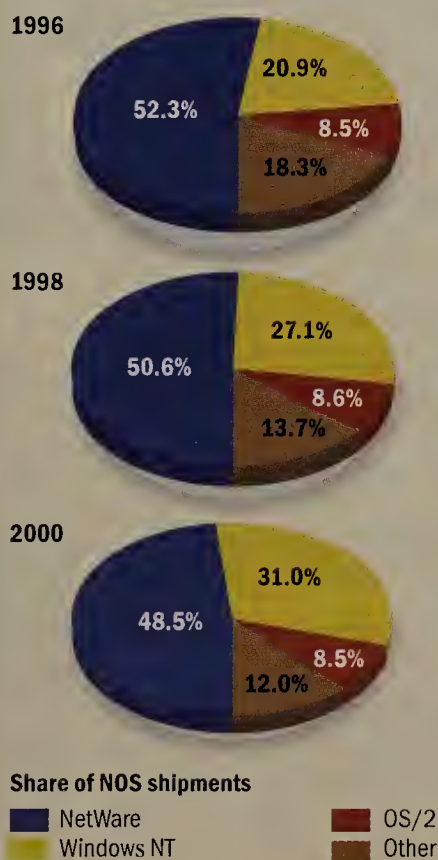
BindView's new NOSadmin for Windows NT plug-in module for EMS will let net administrators analyze system resources for NT servers and workstations.



Through the EMS graphical user interface, users can manage Windows NT and NetWare networks.

HOLDING ITS OWN

While Windows NT Server cuts into NetWare's share of network operating system shipments, OS/2 Warp Server sales are expected to remain consistent over time.



SOURCE: IDC, FRAMINGHAM, MASS.

Vendor flexes RAID muscle

By John Robinson
Nashua, N.H.

Storage Computer Corp. this week will launch an add-on to its high-end storage system that allows administrators to set RAID levels for different data sets across client/server nets.

The company's OmniRAID software lets customers configure concurrent RAID Levels 0, 3, 5 and 7 for data stored on Storage SuperServer, which can attach to multiple servers.

Many products only offer one

RAID level or preconfigure levels for the user.

The OmniRAID software features Post Write Parity, or RAID Level 0, which allows users to set fast throughput for data such as video applications. It also includes a Pipelining feature that allows the Storage SuperServer to automatically switch to RAID Level 3 when large data sets are being transferred.

OmniRAID's Table Vector Parity feature lets users distribute parity data across all drives

(RAID 5) or place data on a dedicated parity drive (RAID 7).

OmniRAID is available now and ships standard with the Storage SuperServer.

Storage Computer this week also will announce the OmniForce product suite for the Storage SuperServer.

OmniForce lets users mirror data in varied configurations, depending on the type of data backup necessary. OmniForce will ship in January and is priced at \$30,000 to \$90,000 per unit license.

Storage Computer: (603) 880-3005.

Features of NOSadmin for Windows NT include:

- Security assessment — Allows administrators to scan all passwords and check for breaks in security.
- Disk space allocation analysis — Sets views of disk space utilized by user, workstation and file type.
- TCP/IP configuration management — Includes analysis of Dynamic Host Configuration Protocol configurations at workstation and server levels.

NOSadmin for Windows NT, built on BindView's Object-Oriented Management Framework, is scheduled to ship in January. Pricing was not available.

BindView: (800) 749-8439.

Ethernet-speed wireless LAN seeks second chance

RadioLAN fixes problems and returns with redesigned edition of its 10BaseRadio offering.

By Jodi Cohen
Sunnyvale, Calif.

When RadioLAN, Inc. last year promised to deliver 10M bit/sec wireless Ether-

net, the industry thought it was too good to be true. As it turned out, it was.

The company had to halt marketing and sales of its 10BaseRadio product for

12 months to solve problems caused mostly by "multipath interference" that occurs when radio waves reflect off physical objects, said Michael Clair, Radio-

LAN's chairman and chief executive officer. Now armed with new radio frequency technology, enhanced software code and a redesigned Application Specific Integrated Circuit, the company is back on track, he said.

Initially, RadioLAN's product received rave reviews because it offered unprecedented bandwidth in a wireless device. The typical wireless LAN data rate is only 1M or 2M bit/sec, but RadioLAN's product promised 10M bit/sec — the magic number for Ethernet.

"RadioLAN's Ethernet-like product was an incredible technology promise," said Virginia Brooks, director of network re-



RadioLAN returns to market after a year-long redesign of its 10M bit/sec wireless LAN device.

search at Aberdeen Group, Inc., a Boston-based consultancy. "And the price was cheap in comparison to other [radio frequency] solutions — about \$400 a unit vs. competitors' products priced at about \$1,000."

The product worked fine in demo environments and picked up the best-of-show award at the NetWorld+Interop 95 show in Las Vegas. But when it was taken out in the real world, there were a lot of bugs.

Despite the delay, RadioLAN still will be first to market with a 10M bit/sec wireless LAN solution, Brooks said.

Customers such as Pete Edgar, LAN supervisor at the University of British Columbia in Vancouver, are glad RadioLAN fixed the bugs. He is using 10Base-Radio in his hard-to-wire building.

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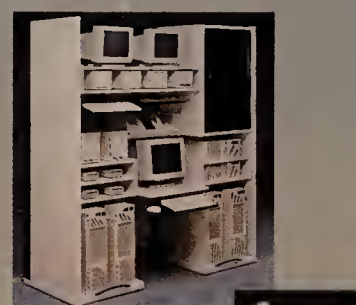
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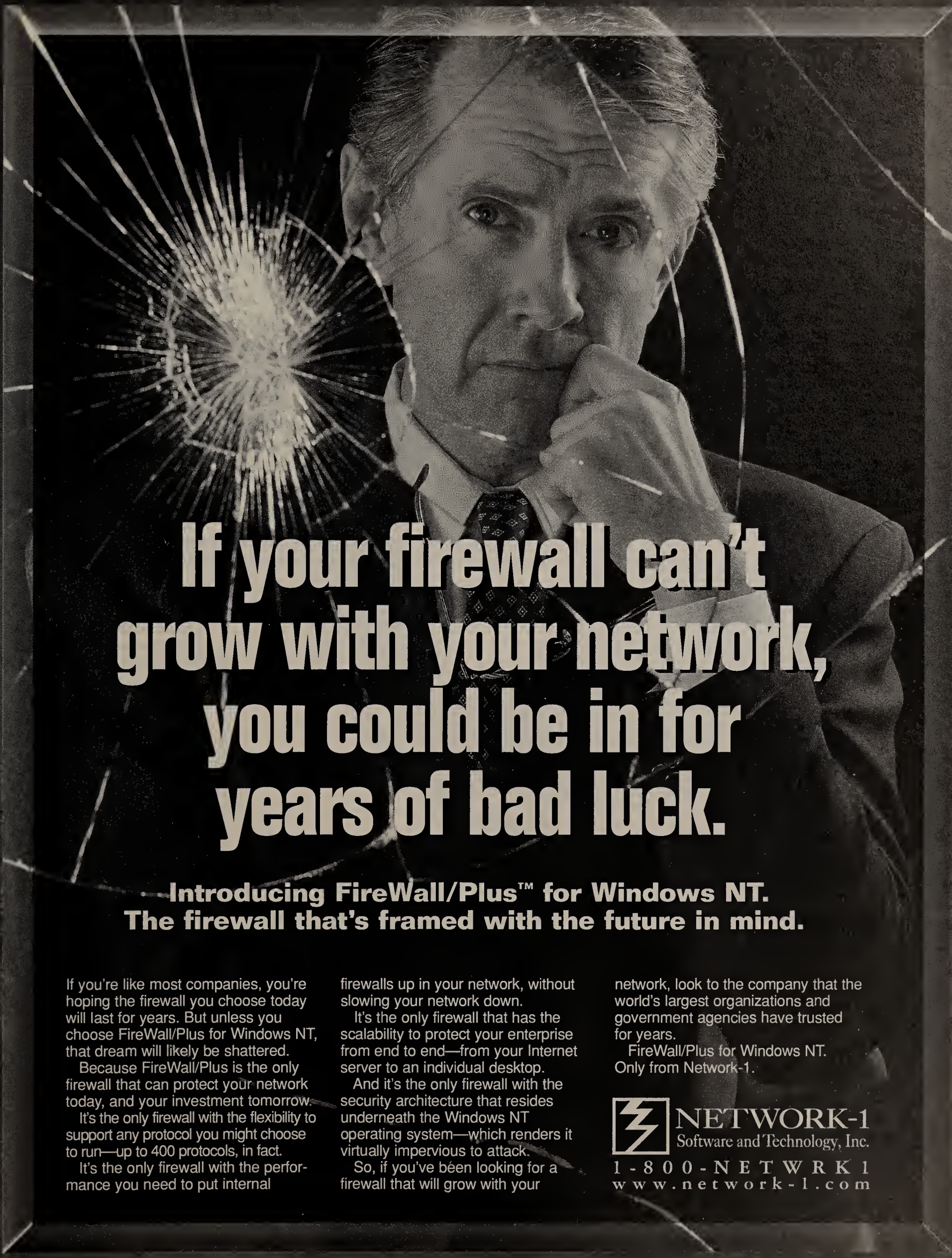
Enter the number above in the DocFinder box on the home page.

<http://www.nwfuslon.com>

"We have some existing wireless LAN products that are just under 1M bit/sec, which were fine for text-based library applications," he said. "But the world has moved on to Web browsers and other graphical applications, and they just don't hack it anymore. So the 10M bit/sec speed was critical."

The 5.8-GHz device — with a distance limitation of 120 feet in a typical office area — comes in two versions. The Wireless Interface Node model, priced at \$499, has a single wireless connection. For users connecting to a wired 10Base-T network, the Wireless Access Point version, priced at \$799, has one wireless connection and one 10Base-T link. Both are available now.

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WIRED WINDOWS

Going back in time to find answers

The speculation is that Microsoft Corp. may change its software distribution methods: Customers would buy

a license once, then pay an annual subscription fee for updates.

Apparently, the firm has been testing

this method of late by freely distributing a spate of beta and evaluation software. Almost every Microsoft application, update or add-on seems to be available from the company's Web site at least once during the product development cycle.

Other companies have proposed a different model: Customers rent software by downloading it from the 'Net only for the

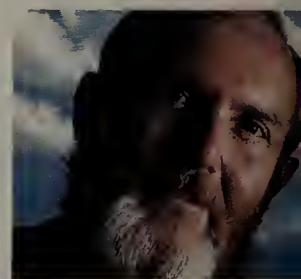
time they need it.

Couple these ideas with the network computer (NC), and I experience déjà vu. It's 30 years ago, and I'm back in mainframe computing.

I think I've figured it out, though. Remember the shock when IBM actually let people go over the past couple of years? In reality, the company didn't simply cut them adrift; rather, it found them all decent positions at the major PC companies, where they're now able to steer consumers toward the ideal world of computing — powerful machines, hidden in back rooms, that serve up screens for end users on underpowered terminals.

Wasn't the so-called PC revolution about giving the user control?

Yes and no. The new model — in the form of an NC or rented software — is not being seriously presented as an alternative to the business PC sitting on your office desktop. It may become the kiosk computer in a corporate waiting room or around the conference table, but it's really the next weapon in the war for the hearts and minds of the home consumer.



Dave Kearns

The strategy might work, though it's too early to tell. The Holy Grail appears to be an information/entertainment device that combines computer, television, game machine and interactive commerce. The companies that come up with the right products to forge this amalgamated device could reap a fortune.

They will have invented a machine just as important to the home market as the computers of the 1960s were to the business market. And just as those computers of the '60s led inexorably to the PC revolution of the '80s, so too will "mainframe TV" devices lead to a similar revolution.

Tip of the week

If you are constantly running out of disk space no matter how big a drive you use, a new product from Mijenix Corp. might be useful. It's called ZipFolders, and it lets you run any program, game and installation program directly from within a ZIP file; compress and decompress automatically at the operating system level; access and modify files within a ZIP file at will from any application; and more. Download an evaluation version by heading over to <http://www.mijenix.com/>.

The leaders of that revolution — the Steve Jobs and Bill Gates of the early 21st century — are most likely in primary school right now. But they're also probably playing with their personal computers when they get home.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached via the Internet at dkearns@msn.com.



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Briefs

■ **Infospace, Inc.** of San Mateo, Calif., last week at DB/EXPO '96 updated two Java applications: *WebSeQueL 1.5* and *WebCharts 2.0*. *WebSeQueL*, which lets users graphically build ad hoc queries to corporate databases and analyze the results, now has a template for creating reusable reports and supports logical autojoins. *WebCharts*, which converts data into Java graphics, now has a Java API and several back-end links drilling down deeper into data. Both products are available now. *WebSeQueL* is priced starting at \$395 per concurrent user; *WebCharts* starts at \$495 for 10 users. Infospace: (415) 655-3700.

■ **NetDynamics, Inc.** of Menlo Park, Calif., last week released Version 3.0 of its *NetDynamics* tool set for **building Web applications**. It has several extensions that interconnect with packaged applications from PeopleSoft, Inc. and SAP AG. It also now works with middleware from IBM and Gradient Technologies, Inc. Version 3.0 also supports Java programming through new wizards.

The software is available now on Windows NT and Unix. The *Application Server* component is priced starting at \$5,000; the development tools, called *Studio Developer System*, start at \$1,295. NetDynamics: (415) 462-7600.

■ **Wall Data, Inc.** of Kirkland, Wash., is shipping a low-cost viewer along with the newest version of its **Salsa** business application builder. *Salsa* lets developers create a graphical model of an application, then it automatically generates the database structures. The resulting application can now be run using the new *Salsa Application Viewer*, priced at \$49. In the past, users needed a complete version of *Salsa* for the Desktop, priced at \$350. Version 2.2 of *Salsa* added support for Microsoft Corp. *SQL Server* in addition to Microsoft Access.

Wall Data: (800) 987-2572.

Application server to ease Web-based transactions

Kiva offerings include development and management tools.

By John Cox
New York

Kiva Software Corp. this week will release software that lets companies build transaction-oriented Web applications.

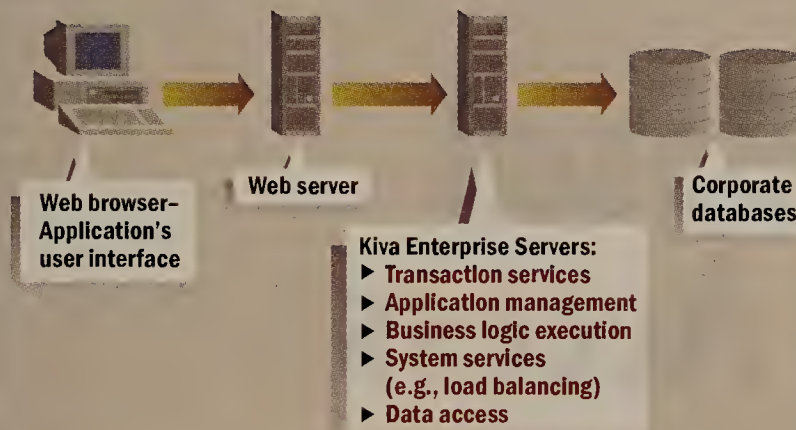
The company's offering centers around Kiva Enterprise Server (KES), a set of vital services that turn business applications into programs that Web browser-equipped end users can make changes to and perform complex queries against.

management and application partitioning; data access; and application logic processing.

In addition to KES, Kiva will unveil a set of application development tools at this week's Fall Internet World '96 show here. The KES Software Developer's Kit (SDK) is a set of C/C++ or Java class libraries that programmers can use with their existing development tool sets to link applications with the various KES services.

Powering Web-based transactions

The Kiva Enterprise Server creates a middle-tier software layer between Web servers and corporate data, providing an array of services to run large-scale, transaction-oriented business applications over the Web.



Today, most Web-based applications are read-only or support just simple queries. That's not good enough for many business applications, such as order taking and customer service, that require changes to be made to databases.

KES brings the application server concept that's gained in popularity among client/server customers to the Web, said Keng Lin, Kiva's founder and president. An application server is a middle tier of software that serves as a liaison—in the case of the Web—between a Web server and a back-end database.

KES runs a business application's logic as well as five service classes: transaction management; application and server management; system services such as load balancing, thread

Corporate application developers can select from a range of third-party tools in C/C++ or Java to write server-based application logic, and from HTML authoring tools to create end-user displays.

The KES architecture is distributed so applications can be partitioned among different KES-equipped servers to improve response time, handle increased traffic and ensure application availability.

Kiva has also designed its server software to be multi-threaded so it can handle lots of requests. In addition, it includes caching and streaming capabilities to minimize response times, and has a load-balancing feature that shifts requests automatically among several Kiva servers.

Other tools in the Kiva arse-

nal include the Kiva Deployment Manager, which lets developers easily package multiple application components and load them on to networked KES machines. Today, Lin said, this work involves a complex series of manual steps.

Rounding out the product line are the Kiva Server Administrator and Kiva Application Manager.

These are graphical programs that give administrators a wide range of facilities for managing applications once they are deployed.

KES is available on Windows

NT, Solaris and HP-UX. Pricing starts at \$25,000 on NT and \$35,000 on Unix. The SDK costs \$995 per developer.

©Kiva: (415) 526-3900.

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Network World Fusion

<http://www.nwfusion.com>



Start-up Novita makes multimedia E-mail a snap

By Paul McNamara

A Java-based client application being announced this week by a start-up here promises thin-client end users an E-mail experience that is anything but skimpy.

Novita Mail, Novita Communications, Inc.'s first product, will give even nontechnical users E-mail that is capable of incorporating pictures, audio, video and even Java applets directly into a message, the company said.

"The only way that can be done today is that you attach it as a file and you count on the other person to have the right software to read it," said Julien Nguyen, Novita's chief executive officer.

Novita Mail lets end users drag and drop images and video snippets into text-based messages, which can then be read directly by other

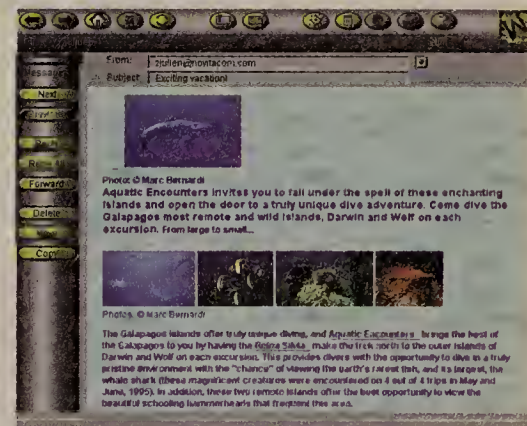
Novita Mail users as well as users of the next major revamp of Netscape Communications Corp.'s Web browser. The video or image takes the form of an attachment for end users of other messaging clients, such as cc:Mail, but the information can be easily viewed by double clicking on it.

Novita Mail, expected to enter beta this month, supports

HTML and is designed to work with Post Office Protocol 3, Internet Message Access Protocol 4 and Simple Mail Transfer Protocol servers. It requires less than 2M bytes of memory.

"The beauty of this product is that it's a client software application, but it works with all existing servers today," said Nazila Alasti, acting vice president of marketing.

The ability to include Java applets within a message, Nguyen added, transforms static text into a workable form. For example, a company might distribute 401(k) information over its intranet—complete with sal-



Novita Mail promises nontechnical users the ability to insert pictures, video and Java-based applets directly into the text of mail without using attachment files.

ary figures and an applet capable of guiding employees through the calculations they will need to consider before signing up.

Novita Mail will be available through OEM partners that will bundle it with their network computers early next year.

It will also be available as a separate software package via the Web for \$29.

©Novita: (408) 745-5991.

SHARED LOGIC

When groupware visions come true

As the year winds down, it's nice to see some of my predictions coming true.

One prediction, delivered in an ad-

dress at the Electronic Messaging Association's client/server messaging conference in January, was that customers would be able to get basic E-mail and groupware

for about \$50 per client in volume.

Without going into the tortured details of multiple pricing schemes, I can say that all the major packages — NotesMail, Exchange, GroupWise and OpenMail — already, or soon will, cost \$50 to \$75 per client in volume. In fact, Netscape Communications Corp.'s Communicator Standard Edition will cost \$49 per client.

While I predicted this good news, I also warned customers that interoperability would be a concern. And indeed, throughout 1996, we kept reading that most integrated groupware packages are proprietary in the way they handle message access, replication, security, access control and directories. You can't really mix different vendors' clients and servers without major loss of functionality.

I don't mean to give the big messaging vendors a hard time. They've done their best to open up to Post Office Protocol 3 (POP3) Internet mail clients, and a few of them have already delivered some form of Lightweight Directory Access Protocol (LDAP) or Internet Message Access Protocol 4 (IMAP4) beta software. But this functionality is confined to the server side, with most clients remaining proprietary.

I may not be going out too far on a limb here, but looking ahead to 1997, I expect messaging/groupware clients to open up.



Daniel Blum

Netscape's new Communicator package raises the bar considerably by providing the most thoroughly standards-based messaging/groupware client suite in history. The Standard Edition consists of five components: Navigator, Messenger, Collabra, Composer and Conference. The Professional Edition will add Calendar, AutoAdmin and IBM Host On-Demand.

Netscape Messenger supports POP3, IMAP4 and LDAP. Collabra supports the Network News Transfer Protocol, an old 'Net standby. The Web's HTML pages and forms are at the core of all components.

Communicator cannot yet compete with Exchange or GroupWise, much less Notes Domino, on workflow and application development capabilities. However, features and functions have improved over Navigator 3.0.

Messenger, for instance, now includes rules and filters to help manage your overflowing in-box. New Internet delivery receipts and notifications will inform you if your sent messages arrived safely at their destination. Java comes with a larger sandbox, in which trusted applets may occasionally drop in and ask for a slice of your hard drive.

Netscape might like you to run Communicator over its latest SuiteSpot server offering, but by design you don't have to go with an all-Netscape solution. Control Data Corp.'s Rialto, Hewlett-Packard Co.'s OpenMail, and a host of other products support POP3 and LDAP in production or beta software.

In 1997, we'll finally get to see whether client/server messaging vendors can work together better.

Blum is a principal at Rapport Communication, a consultancy that focuses on messaging, groupware and electronic commerce. He can be reached at dblum@interramp.com.

He Must Be Talking About

Clinton Eyes "Legacy" Issues

President Clinton plans to take on two incendiary political issues — security and the environment — in his first year of office. — USA TODAY

Browser-Based Mainframe Access

Hail to the Chief! If the President of the United States is looking into it — it must be important. Browser-based access to "legacy" systems makes existing applications and data more widely available to internal customers over intranets, and extends this infrastructure to customers, distribution channels, and business partners over the Internet.

The advantages of integrating host information using OpenConnect's new SNA Web co-processing technology, OC://WebConnect™, and its companion integrated development environment, OpenVista™, have become very compelling. OpenConnect Systems' browser-based host access increases the value and the availability of SNA mainframe and midrange applications and data without sacrificing SNA network

performance, management or security.

Using OpenVista, you can rejuvenate host applications with graphical user interfaces and offer them to a whole new class of users with less training, and little or no distribution costs. You'll reduce network bandwidth utilization, without modifying the existing host application.

To learn how you can make the move to browser-based access for your mainframe, call for your free white paper which outlines the business benefits of browser-based host access and rejuvenating your mainframe applications. Doing so will make you appear very presidential.



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Circle Reader Service #14

Intranets & the 'Net

Covering: Internet Technologies and Services
for Collaboration and Electronic Commerce

Briefs

■ **Microsoft Corp.** today will release the first public beta of its **Web application development tool**, code-named *Internet Studio*. The tool enables developers in a visual environment to easily build Web applications that use server-side processing and connect with corporate databases.

Microsoft: (800) 426-9400.

■ **Business Software Alliance** President Robert Holleyman last week ruffled off a **letter of outrage** to Vice President Al Gore about the way the Clinton administration is implementing the data-recovery encryption policy it outlined in October.



Holleyman said the administration promised easy export of 56-bit encryption, but life is actually getting more difficult because the administration is requiring reviews of existing product export licenses, "only this time with FBI scrutiny."

■ **Burlington, Mass., start-up Novera Software, Inc.** last week released a free 60-day trial version of their **Java-based operating system**, the *Novera Enterprise Platform for Internet Connectivity*. It can be downloaded from www.novera.com.

Novera: (617) 270-4422.

■ **Internet Security Systems, Inc.** today announced *RealSecure*, a **Unix-based network sniffer** that monitors network traffic for a wide variety of attacks, such as hacker attempts to break into an intranet or disruptions such as SYN flooding.

RealSecure lets managers keep reports of suspect incidents or automatically cut real-time connections once suspect incidents are detected.

Internet Security Systems: (770) 395-0150.

Macromedia constructs new Backstage

By Carol Sliwa
New York

The creation of database-driven Web sites and applications will get more visual with the release of Backstage Internet Studio 2.0 from Macromedia, Inc., the San Francisco-based company said today.

With the latest release of the software tool, users will not need to tap their programming skills to connect Web page forms to client/server and desktop databases. Instead, wizards can help prompt them through the process, in step-by-step fashion.

Experienced developers who want to get at the source code to create more sophisticated applications can do that. But "with some basic knowledge of your database and how it's structured, you can do some fairly amazing things" with the standard Backstage product, said Rich Bandel, Nashville-based team leader of multimedia services for Deloitte & Touche.

His company, for instance, is giving all of its employees access

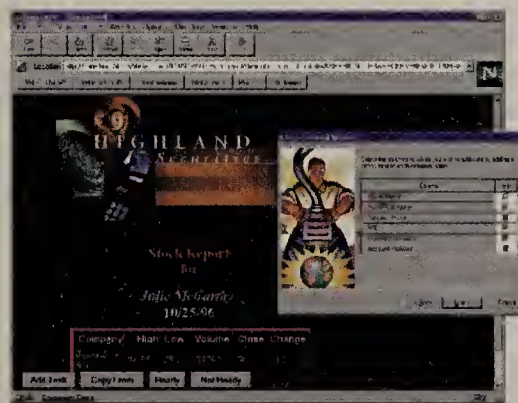
to their vacation time and 401(k) information over a corporate intranet through applications built using Backstage.

One new Backstage feature that Bandel thinks will be particularly useful is the data "drill-down" capability. Columns or rows of data become hyperlinks that, when clicked, drill down for additional information.

For instance, a Deloitte & Touche manager trying to determine which clients are spending at least \$100,000 could query the database, find out who the clients are and use an HTML page to display the information in table format, Bandel said. With the new drill-down feature, any box in that table becomes a hyperlink that can bore in for more details about any client.

"Without Backstage, you'd have to have your own set of objects that communicate with

[Open Database Connectivity] and you'd have to write [Common Gateway Interface] scripts that call your custom database objects," Bandel said.



Macromedia's Backstage Internet Studio 2.0 has wizards to help users build database-connected forms.

Jim Spraggett, president of Toronto-based Canadian Information Systems, Inc., said his company needed a couple of days to implement drill-down functionality for Grand & Toy, a Canadian office supply firm.

"Now it's there for everybody to use in Version 2," Spraggett said. "You can just keep on click-

ing down, down, down through data. It's much like URLs on the Web."

Other new Backstage features include automatic Web server configuration, hyperlink management capabilities and a Java-based library called Applet Ace.

The software, which runs on Windows 95 and NT, comes with four major pieces: a Backstage Designer WYSIWYG HTML editor, a Backstage Manager for administering multiple sites, a Backstage Server that retrieves and delivers information to and from databases, and a set of 16 Backstage Objects for building Web-based business applications without programming.

More noted for its Shockwave Web browser plug-in, Macromedia is focusing on corporate IS professionals delivering business applications with Backstage.

"[Backstage] is really an intranet product, and that's not Macromedia's typical market," said Joan-Carol Brigham, an Internet research manager for International Data Corp. "So, they need to educate corporations as to who they are."

A beta version of Backstage

Bankers Trust sells commerce

By Ellen Messmer
New York

Bankers Trust Co. today officially launched a spin-off called CertCo LLC to provide electronic commerce software and services for the banking industry.

CertCo Chairman Peter Freund said by mid-1997 the company will offer X.509-based software and consulting to banks so they can issue digital certificates on a subscription basis to customers. The X.509 certificates let users digitally "sign" documents, such as purchase orders, on the Internet or inside corporate intranets.

"Every single bank will be driven to Internet banking, and to authenticate depositors, they will have to be a certificate authority," predicted Freund, formerly derivatives risk man-

ager at Bankers Trust.

Because organizations may want to narrowly tailor how individuals use digital certificates, CertCo is also developing an extension called the authorization certificate that can be tacked on to any X.509 certificate to limit its use to designated transactions.



CertCo's Freund

The ANSI X9.45 committee is set to finalize the authorization certificate as a standard by early next year, Freund said.

As part of its electronic commerce strategy, Bankers Trust two years ago purchased patents for key-escrow technology from inventor Silvio Micali at a price sources pegged at more than \$1 million—a figure Freund did not dispute.

The Micali patents define a way to split an encryption key

into two or more fragments so they can be held by trusted third parties before the user's encryption key is activated to scramble data.

Freund said CertCo will sell the equipment to let organizations operate as trusted third parties or secure facilities. Bankers Trust is also expected to offer both services in the future. "The user gets a menu of choices of where he would leave his encryption key's fragments," Freund said.

CertCo itself will not operate digital certificate or key-escrow services, he said. The only area where CertCo is expected to compete directly is with a new service it will offer to banks and merchants next year for handling micropayments over the Internet.

The electronic wallet, based on public-key technologies that CertCo is developing, will let buyers make small payments, such as a nickel, on the Internet in instances when a credit card would not be used. ■

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<http://www.nwfusion.com>

Internet Studio 2.0 will be available at the end of this month. The final product is due to ship in the first quarter of 1997.

The desktop edition, priced at \$299, works with desktop-based databases, including Microsoft Access, Excel and FoxPro. The enterprise edition, priced at \$999, works with ODBC-compliant databases from major vendors such as Oracle Corp., Sybase, Inc., Informix Software, Inc. and Microsoft Corp.

©Macromedia: (800) 457-1774.

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Circle Reader Service #6

NET INSIDER

Are bits to the desktop a good idea?

The war cry (or is it mantra?) of the moment seems to be "The Internet in every classroom." Many believe the idea sounds great, putting the world at the

beck and call of young exploring minds. But I'm not quite so sure.

From the president and vice president on down, this seems like an idea whose

time has come. The idea is not all that new, but was strongly revitalized near the end of the presidential campaign. The new administration's effort builds on a series of "Net Days" that have been held around the country for the last year or so. The idea is to wire the schools to support Internet access from every classroom. The 'Net Days seem to have been a big success,

with many schools benefiting from volunteer labor and donated supplies.

There is a problem in how to get, maintain and update the computers that will be needed, but let's put that issue aside. How the ongoing connections to the Internet should be financed is still foggy.

There are suggestions that Internet service providers should be required to provide access for significant discounts (80% is one number I read) or even for free. This could be mandated of the ISPs or subsidized with money from the existing universal access funds maintained by the telephone companies. This aspect could get astonishingly complex quite quickly. Creating a set of rules that can span the range from AT&T and MCI to "Ma and Pa's Bits to Go" is more than a challenge. But let's just put off any concerns about that as implementation details. Let's think about a more basic question: Is it a good idea to bring Internet access to all classrooms?

Some people are worried about what inquiring eyes might see or read out there on the 'Net. One proposal I saw would block kids from using the Internet connection until they had a signed permission note from their parents, **Scott Bradner** and the note



had to absolve the school and teacher of all liability in case the student should catch a glimpse of *what shouldn't be seen*.

The definition of this varies from parent to parent. But putting that aside, is this omnipresent school access a good idea?

I think a more fundamental issue is that of teacher preparedness. If the classroom teacher is not ready to guide the experience, the Internet can be an overly confusing place. The 'Net presents a cacophony of information, images, ideas and experiences. Even sidestepping the problems involved in shielding kids from some things they would like to "research" if left on their own, the Internet is not a structured learning environment. T.S. Elliot once said "hell is where nothing connects to nothing." There are few things that can disrupt the learning process more effectively than random, disconnected pieces of information.

But for those of us who remember the "new math," there may be the same benefit in wiring the classrooms as there was in restructuring math education; it meant that teachers had to go back to school to learn what to teach, and along the way they often took a refresher course in how to teach. That might not be all bad today.

Disclaimer: Harvard claims not to be hell (though it may be down the street), and does not have an opinion on the new math or any or the above.

Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu.

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COVER STORY

14 Encryption Software: 4 Packages That Secure Your Data

Are you concerned about protecting the information on your computer? Our reviewer evaluates four desktop encryption products aimed at keeping your data safe.

SOFTWARE

10 GroupWise 5.0: Innovative E-Mail for NetWare Users

Our reviewer evaluated the latest release of GroupWise, finding that it's a great product for NetWare users. And to help you make the right choice for your agency, we've also provided links to our previous groupware reviews on our Web site at www.fcw.com/pubs/gbb.

SYSTEMS

20 Secure Web Transactions: Is the Technology Ready for Prime Time?

With the Internet rapidly maturing as a means of commerce, agencies are ready to conduct transactions over the Web. But can you really make the Web secure? We've got the story on the latest protocols and the newest products.

DEPARTMENTS

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Micro Logic's DiskMapper

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NT Workstations

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FROM THE EDITOR

You don't have to look very hard to find reasons why security is one of the most important issues facing federal IS managers. According to a recent study conducted by International Data Corp. of 800 federal Internet users, security rated as the top concern in managing federal Internet sites. It's no wonder. Security incidents reported to the Defense Department's Computer Emergency Response Team have increased from six in 1988 to 2,412 in 1995. Even the CIA has had its Web site attacked by cybervandals.

At the same time, agencies can no longer afford to buy unique, government-specific security products to keep their data safe. Instead, they need to adopt commercial off-the-shelf security products and solutions.

In this issue of *Government Best Buys*, we've reviewed four PC-based encryption software packages that would be solid yet affordable solutions for agencies trying to keep sensitive-but-unclassified information secure.



All these packages use proven encryption algorithms and offer multiple layers of security, including private key, public key and digital signatures. They're all easy-to-use Windows applications with familiar graphical interfaces. And they all sell for less than \$140, with significant discounts available for volume purchases.

These packages won't do it all, though. Your agency still needs strong and workable security policies. These packages

will let you receive an encrypted message from someone and verify the sender's identity, but if you print the message out and leave it lying around, then it's no longer secure.

In addition to the encryption review, we've included a story on secure Web transactions. The idea behind the story was to determine how mature the technology is and whether it's ready for heavy-duty government applications. The answer is yes and no. True, individual products such as secure Web browsers and servers are available, but integrating those products into an overall secure solution remains a real challenge.

Look for more security-oriented coverage in our January issue, when we review the five best-selling firewall packages in the government market.

Carolyn Duffy Marsan
Editor
Government Best Buys

LETTERS TO THE EDITOR

Don't forget Macs 1

Your Oct. 7 supplement does a nice job of covering not only Windows NT/Windows 95 products for Web service and Java development, but it was kind enough to include boxes with references to a few of the Mac products available for the same purposes.

I realize the preponderance of Intel-based machines in many government applications. At the risk of seeming like Yet Another Mac Fanatic, I would like to call your attention to an article in the Oct. 21, 1996 *Washington Post* Business Week section ("In a Way, the Web Acts as Apple's Safety Net," Victoria Shannon, page F21) that noted over 40 percent of all the graphics content on the Web is developed on Macintoshes, and 20 percent of all Web servers are Macs. Both figures are way out of proportion to the total numbers of boxes sold (since Apple has only 6 to 7 percent of the new sales market), but it could be an indication that you need to examine the best tools for particular jobs, instead of assuming everything done in the government is and must be done

on operating systems from Redmond, Wash.

Joseph B. Gurnan
NASA Goddard Space Flight Ctr.
Greenbelt, Md.

Editor's reply:

My first PC was a Mac, so I understand why people are so loyal to this easy-to-use platform. However, the reality is that Macs have an even smaller share of the government market than overall — only 4.2 percent, according to International Data Corp. Most agencies are buying Microsoft Windows NT or Sun Solaris platforms for hosting Web servers. If our readers start buying more Macs, we'll start covering more Mac products.

Don't forget Macs 2

You forgot one. In your "Web Server Software" comparison [*GBB*, Oct. 7], you made the classic cop-out of reviewing only Windows NT-based packages! This means that: 1) you didn't have access to a Mac; 2) you didn't know Macs are great Web servers; 3) you've been brainwashed by Microsoft; or 4) you had to meet a deadline, and producing

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GOVERNMENT BEST BUYS!**

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a legitimate product comparison was less important than beating the clock. I don't mean to sound harsh, and perhaps I expect too much from a product comparison; however, a comparison only of NT-based products is somewhat akin to a comparison of sports cars which includes only domestic auto makers.

As a taxpayer, I would say that the government needs to get the best cost-vs.-performance ratio available. As a network administrator/PC technician who works extensively with NT, Win95, Unix and Mac OS, I will say that a Macintosh-based Web server wins over an NT server hands-down in that arena. It's easier to configure, easier to maintain, more secure, less expensive and just as fast. These are facts, proven in tests and surveys. . . yes, even though it goes against the industry's Microsoft bias!

Please stretch your horizons and take the initiative to do a legitimate product comparison next time. Throw some Apples in with the oranges.

Jon L. Gardner
Network Administrator
City of Bryan, Texas

Editor's reply:

Yes, we have access to Macs in our test center. Yes, we knew that a small — very small — group of our readers use Macs as Web servers. No, we haven't been brainwashed by Microsoft. And no, we didn't choose meeting our deadline over producing a quality review. As I stated above, the vast majority of our readers use Windows platforms, and we're trying to serve them. That said, we will continue to look at Mac-based products, as we did in our October reviews of Hypertext Markup Language editors and Java development tools. We also will continue to test for Mac compatibility in reviews such as our August comparison of 17-inch monitors.

More on monitors

I just read Jeffrey Angus' review of 17-inch monitors [GBB, Aug. 5]. It was a good subjective review.

I'm primarily concerned with image detail quality, especially for lots of text windows. I'm a Unix Internet coder and would have liked to have seen more quantitative information. The comparison table should have included the actual visible area (such as usable diagonal raster), maximum actual raster size (in pixels), resolution (dots/mm) refresh rate, etc. I am

interested in rasters of a minimum of 1,024 by 768 and would prefer 1,152 by 900 or 1,280 by 1,024.

Some monitors proclaim they can support these "resolutions," but their electronics frequently do not have the bandwidth, or their shadowmasks have too few dots to

support them. This really needs to be pointed out.

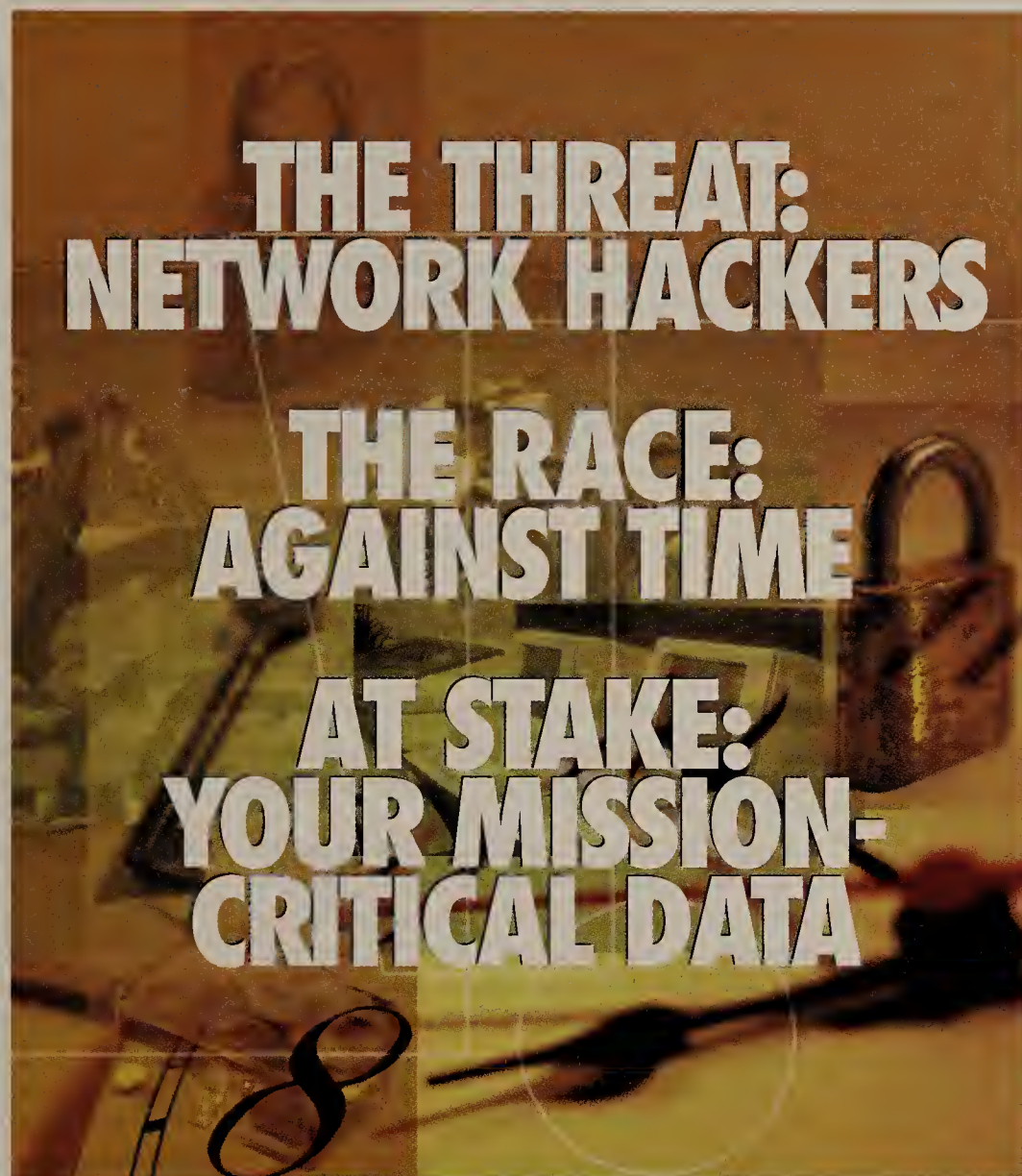
I would also have been interested in seeing a review of one of the Nanao monitors. I've had one for a couple years and am very happy with it; a colleague in video production swears by them.

In the future, I would be interested in seeing a review of 19-inch and larger monitors. At the prices they command, I can't afford to make a purchasing mistake.

C. Shenton
NASA Headquarters

Editor's reply:

Thanks for the input. We'll do our best to add the quantitative information in our next review of monitors, which will likely be 19-inch systems.



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- Is responsible for implementing IT security programs or projects.

The Agenda:

- 7:30 am** Registration and Continental Breakfast
- 8:30 am** Introduction
- 8:50 am** Internet/Intranet Structures — Yesterday and Today
- 9:15 am** Security Obstacles of Internet/Intranet
- 10:00 am** Break
- 10:15 am** Planning and Implementing Secure Networks
- 11:15 am** BTG/Cisco Solutions
- 11:45 am** Questions and Answers
- 12 Noon** Conclusion

Notebook Watchdogs

Security experts have coined new terms, such as "notebook nabbing" and lap-jacking," to describe the growing trend of notebook computer thefts.

To combat these thefts, Innovative Security Products, based in Shawnee Mission, Kan., is shipping Alarm Guard, a portable alarm-sounding security device used to stop notebook computer theft.

The product includes a 1-ounce transmitter that either attaches securely to the computer or can be slipped into a briefcase to provide inconspicuous protection. A 3-ounce receiver is worn either on a belt or placed in a pocket. A piercing alarm sounds when the transmitter is separated from the receiver. If a thief attempts to turn the transmitter off before taking the computer, the receiver alarm sounds continuously.

Mike Cameron, president of Innovative, said notebook computers are prime targets for thieves to steal

from desks, offices or airports. A newer notebook computer can be sold by a thief for as much as half of its retail value, he said.

Safeware Insurance Co. recently reported that one out of every 14 notebook

computers sold in the United States was reported stolen last year. That amounts to more than 200,000 notebooks in 1995. This is a 39 percent increase compared with 1994.

In fact, theft at airports has become such a problem that the Federal Aviation Administration has issued warnings about the popular scam of stealing notebook computers from the conveyor belts of metal detectors.

Innovative, which also sells the first all-steel lid lock for PCs to prevent memory and component theft, has priced Alarm Guard at \$49.95. For more information, call (913) 385-2002.

— Heather Harreld

Tempo Adds Switches

Defense Department users who want to connect their disparate local-area networks can now obtain Xylan Corp.'s family of OmniSwitch and PizzaSwitch products from Bell Atlantic's Telecommunications Modernization Project (Tempo) contract.

Calabasas, Calif.-based Xylan officials said the high-speed LAN switches are the only ones on the market that perform the protocol translations necessary to allow, for example, Ethernet LANs to communicate with Token Ring networks. "I can mix any technology in one box," a company spokesman said.

The OmniSwitch is a larger modular unit with a chassis that allows users to plug in cards. The PizzaSwitch comes with 12 Ethernet ports and allows for plug-in modules to accommodate technologies such as Fiber Distributed Data Interface and Fast Ethernet.

A basic OmniSwitch unit is priced at \$9,095, which includes software and management modules. The Tempo price for the basic 12-port PizzaSwitch is \$7,450. For more information, contact John Mazzaferro, Xylan's director of corporate communications, at (818) 878-4714.

— Brad Bass

Enhanced E-mail

Qualcomm Inc. has enhanced its Internet electronic mail product, adding features that make it easier for users to organize their messages and support multiple e-mail accounts.

Eudora Pro 3.0 for Windows supports message filtering that allows users to sort incoming or outgoing messages into mailboxes, forward e-mail to other locations or people, send automated replies and alert users when important messages arrive. Users can also access their different Internet mail server accounts from within a single copy of Eudora Pro 3.0.

Other new features include support for third-party plug-in applications, such as data compression and data security services; support for drag and drop of text; a customizable address book; and improved text formatting.

One plus for government users is that Eudora Pro 3.0 is Transmission Control Protocol/Internet Protocol-

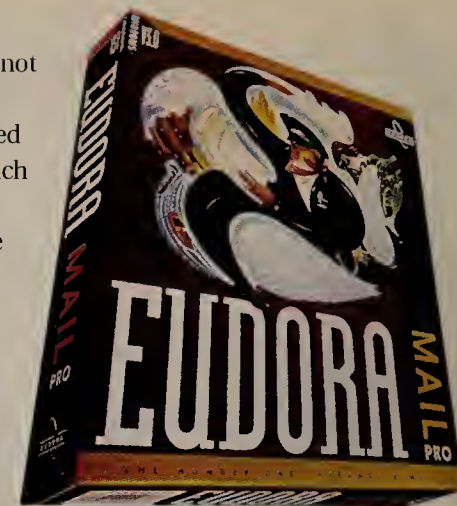
based and does not use gateways — unlike LAN-based packages — which should make it easier to encode and send message attachments.

Some of the company's government users include

Lawrence Livermore National Laboratories, the National Institutes of Health and the Naval Research Lab.

Eudora Pro 3.0 supports Windows 3.1, Windows 95 and Windows NT and lists for \$89. For more information, call Qualcomm, San Diego, at (800) 2-EUDORA or order electronically from the company's Web site at www.eudora.com.

— Colleen O'Hara



PC-Based Unix

Opus Systems in November started shipping an add-in board that allows a PC to run high-end Unix applications designed for Sun Microsystems Inc. SPARCstations.

Opus Systems' Turbo SPARCard 5 is based on Fujitsu Microelectronics Inc.'s TurboSPARC processor. Turbo SPARCard 5 doubles the performance of the company's predecessor products, which have seen use in the Defense Department and the intelligence community.

Turbo SPARCard 5 is binary-compatible with Sun workstations, runs the Solaris operating system and supports more than 10,000 Catalyst (SPARCware) applications. The product comes bundled with Incognito, which is software that lets users access the SPARC environment from their Microsoft Windows-based PCs. This allows users to cut and paste between Windows and Unix applications and launch Unix applications from Windows.

Craig Forney, president of Opus Systems, said the product helps organizations moving from Unix to Windows NT. "It becomes a transition aid," he said.

A Turbo SPARCard 5 system, which includes the add-in board, Incognito software, PC3i frame buffer and Solaris license, is priced at \$5,495, with quantity discounts available. PSC Inc., Reston, Va., plans to carry the product on the General Services Administration schedule.

For more information on the company's products, contact the company's Web site at www.opus.com. For federal sales information, contact PSC's Web site at www.pscusa.com

— John Moore



HARDWARE HELP

If you're going to buy a notebook computer, here's the minimum configuration we recommend:

SCREEN

Dual-scan passive-matrix color screen

SOUND CARD

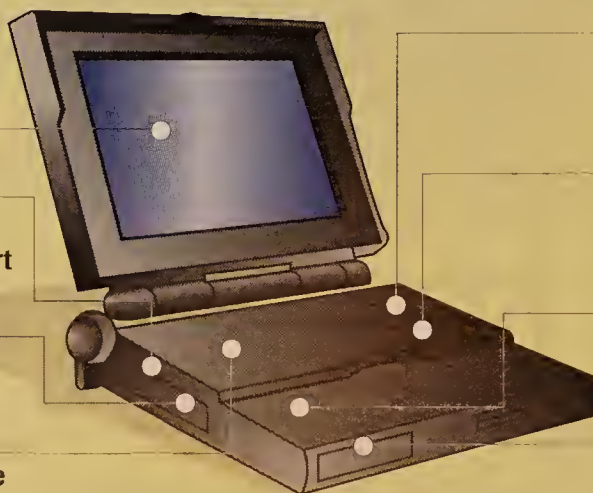
Built-in or PC Card
16-bit sound card support

MODEM

28.8 kilobit/sec PC Card

VIDEO

1M VRAM — expandable



CPU

133 MHz Pentium

MEMORY

16M of RAM

HARD DRIVE

1.2G

CD-ROM

Quad-speed

ACCESSORIES: Sturdy carrying case

\$3,500

computer monitor and the keyboard, turns itself on when a piece of paper is inserted. The product requires at least an Intel Corp. 386-based PC running Microsoft Windows 3.1 or higher, Windows for Workgroups or Windows 95 with 4M of RAM.

Government users of Visioneer products include the office of Sen. John Ashcroft (R-Mo.) and the U.S. Postal Service. The PaperPort Vx is priced at \$297 on the GSA schedule and \$289 on the National Institutes of Health's Electronic Computer Store. For more information, contact GTSI at (800) 999-4874 or www.gtsi.com.

— Elana Varon

Inexpensive Web Tools

When was the last time you got a good deal for less than \$5? Now Internet users can buy a powerful new viewer tool for only a few bucks that allows users to customize Web-based content.

SoftQuad Inc.'s HoTMetal Intranet Publisher Viewer is an add-on to current browsers that redefines the way users can access information on the Internet and intranets. Users can create live tables of contents on the fly and mine information using context-sensitive searches. Users can also subscribe to specific Web pages, and when the information on these pages changes, the user is automatically notified by e-mail. The viewer also enables users to create, maintain and share their own annotations. Annotations are saved as a separate layer that appears on top of a Web page but does not affect the source document.

The viewer will begin shipping in the third week of November in all retail versions of Microsoft's Internet Explorer and is included in new retail copies of the Windows 95 operating system. The basic stand-alone product is listed at \$3.95, and the pilot version, which includes an authoring tool and 10 viewers, is listed at \$4.95.

SoftQuad, based in Toronto, Ontario, can be contacted at (416) 544-9000 or at www.softquad.com.

— Heather Harrel

BEST-SELLING SOFTWARE

Oct.	Sept.	Product	Company
1	17	DOS v6.22	Microsoft
2	1	Windows NT Server	Microsoft
3	19	Windows for Workgroups	Microsoft
4	2	Exchange 4.0	Microsoft
5	5	Windows 95	Microsoft
6	3	Office Pro v7.0	Microsoft
7	6	System Management Server	Microsoft
8	4	Navigator v2.0	Netscape
9	—	BackOffice (Client)	Microsoft
10	8	Notes v4.1	Lotus
11	7	Windows NT Workstation v3.51	Microsoft
12	15	SmartSuite 96	Lotus
13	9	Office Pro v4.3	Microsoft
14	—	SQL Server v6.5	Microsoft
15	—	Project v4.1	Microsoft
16	10	Office v7.0	Microsoft
17	—	Office for Mac/PowerMac	Microsoft
18	11	FormFlow v2.0	Symantec
19	—	Access v2.0	Microsoft
20	18	Office v4.21	Microsoft

This list ranks the top 20 software products according to the total number of units sold in October 1996 on the General Services Administration's multiple-award schedule B/C, as compiled by Government Technology Services Inc., the largest GSA reseller.

STATE AND LOCAL

Video Duplication

Duplicating large numbers of video cassettes doesn't have to be a daunting chore. That's the premise behind the new Turn-Key VHS Duplication System that the Sony Government Sales Group, Montvale, N.J., is now selling to state, local and federal government agencies.

The Turn-Key system, designed for schools and other organizations that use videos in education and training programs, comes with a Microsoft Corp. Windows-based application to manage 21 to 1,000 recording units and schedule up to 10 hours of unattended recording, Sony said.

The company's Integrated Duplication Operations (IDO) software provides a graphical display of the recording units by racks or groups of records, so users have a clear view of the system layout as they schedule jobs. The software also keeps a record of all jobs for future reference. The Turn-Key system uses a

"video fingerprint" to trace duplicate cassettes back to their original sources, the company said.

In addition to IDO software, a duplication system consists of Sony's SVO-965 VHS Duplication Recorder/Player and the SRVM-960 Bi-Directional Remote Control Unit. The system operator manages all the systems from a central console.

Sony provides a full day of employee training on the system and a toll-free number for remote troubleshooting. However, the Turn-Key system is designed to be used by nontechnical people, a company spokeswoman said.

Sony's Turn-Key VHS Duplication System, available on the GSA schedule and from a number of resellers in the government market, has a suggested retail price of \$84,000 for the 21-unit base system. For more information, call Sony at (800) 472-SONY.

— John Stein Monroe

Managing GIS Documents

Document management and geographic information systems (GIS) at first seem to have little in common, but Access Corp., Cincinnati, and Environmental Systems Research Institute Inc., Redlands, Calif., have teamed to marry the two technologies.

Embedded within Access' Cimage Document Management System 3.0 is ESRI's ArcView GIS 3.0. The new application allows users to refer to a digital map to locate and click on an area or structure to display documents that pertain to that subject.

A National Park Service employee, for example, could click on a national park to access the Cimage Document Attribute database, which is a vault of documents that relate to a particular area or structure. The database could include maintenance records on cabins and trails, land purchase documents, blueprints or construction contracts.

"What you're really doing is geographically enabling your document system," said Marc Baines, vice president of sales for Access.

Federal agencies can purchase the Cimage/ArcView product through Cordant Inc. on the Navy's Computer-Aided Design-2 contract. Pricing runs from \$300 to \$2,000 per seat. For more information, call (800) 736-1234 or access www.cimage.co.uk.

— Allan Holmes

Ruggedized Pen-Based Computing

More power is at hand for pen-based computer users.

Kalidor, a division of ALPS Electric Inc., has introduced an upgraded version of its ruggedized K2500 pen-based computer. The 100 MHz 486-based machine can be configured with 8M to 24M of RAM and comes loaded with Window 95, Windows 3.1, PenRight!Pro or PenDOS operating systems.

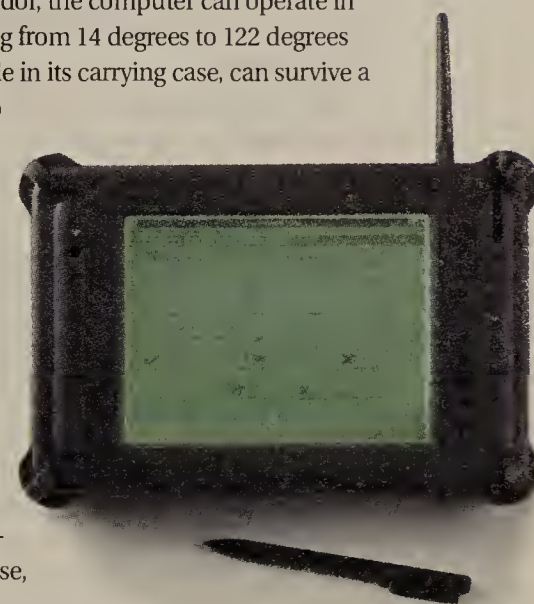
The system also comes configured with two standard PCMCIA Type II slots and is designed to support network, Global Positioning System and fax applications.

According to Kalidor, the computer can operate in temperatures ranging from 14 degrees to 122 degrees Fahrenheit and, while in its carrying case, can survive a fall of three feet onto concrete.

The K2500, which retails commercially for \$4,495 to \$4,995, is designed for government agencies with field data collection, geographic information systems, law enforcement and military applications. Kalidor, San Jose, Calif., is making arrangements to sell the product on the GSA schedule.

For more information, call Kalidor at (408) 432-6000.

— Elana Varon



Holiday Gift Ideas

Looking for gifts for your favorite computer gurus this holiday season? Lexmark International, Lexington, Ky., is offering a selection of color ink-jet and monochrome laser printers for a limited time through a federal employee purchase program.

Lexmark is making color thermal ink-jet printers — including the Color Jetprinter line and the WinWriter 150c as well as the Optra E laser printer, a 600-by-600-dots-per-inch monochrome laser printer — available to federal employees for GSA prices.

The GSA price for the Color Jetprinter 1020 is \$147, the 2050 is \$246, and the 2070 is \$337. The WinWriter 150c is \$186. The Optra E laser printer is priced at \$498, and with 1M of memory it costs \$679. Extra memory and accessories for the Optra E are available.

The program is open to all federal employees for personal use only, and purchases must be made with a personal credit card. This offer ends March 31, 1997. To order, call (800) 258-8575. For more info on the products and a list of GSA prices, check out Lexmark's Web site at www.lexmark.com/industry/federal.

— Dustee Anderson

Micro Logic DiskMapper

Managing Hard Disk Space

BY LINDA ROHRBOUGH

It seems like everyone is touting something new for hard disk file management. I think that most people should install larger hard disk drives. But if you can't afford to do that, Micro Logic Corp.'s DiskMapper may fill the bill.

To graphically display the allocation of space in your hard disk directory structure, DiskMapper uses rectangles within other rectangles that are proportional to one another. Rectangles work well because you can nest them one inside the other to represent the logic of the directory structure. The largest directories are on the upper left, and the smallest ones are on the lower right.

DiskMapper was like getting new glasses: What had been unclear before suddenly came into sharp focus. I discovered that a project I recently completed was hog-

ging the majority of my hard disk space — even more than Windows 95. I also discovered I had a couple of versions of the same large shareware game and that my CompuServe mail file cabinet of saved messages was a whopping 27M in size.

DiskMapper provides several options for looking at your hard disk, including Levels, Age, Extension, Protected, Never Used After Creation and Archive. Because I have few read-only files, the Protected view didn't help me much. The Archive view shows you what's compressed, no matter what was used to do the compression. This means you'll see .ZIP files, the Windows swap file with the extension .SWP, .EXE files and others shown as archive files. DiskMapper can also compress files or directories.

The Age, Levels (meaning directory levels) and Never Used After Creation were the most useful ways for me to look at my hard disk. For example, I could look at the directories and files by their age in a color-coded scheme. What I found out was that most of the files on my hard disk are not changed often.

However, the free space on your hard disk drive can be deceiving, depending on the size of your clusters. Clusters form groups called sectors, which usually contain between two and five clusters, so this is like having a group of large lockers. If you rent a locker to store something, you pay the same amount whether you simply put a pair of tennis shoes in the locker or you put in all your clothes for a week. On a hard disk drive, you end up with a similar problem as an entire sector is allocated for each file. If the files are large, this system helps speed file access. If the files are small, the remainder of the sector is wasted. By storing a lot of small files, you use up hard disk space faster. So, if I have 175M of hard disk space left, but I store a lot of small files, I could lose as much as 40 percent of that space. So, I start worrying about hard disk space when I'm about 15 to 20 percent away from the limit, which in this case is at 200M of free space.

Because file sizes are growing steadily with the advent of more complex data such as multimedia, I anticipate the cluster size problem will not be an issue in a year or so anyway. DiskMapper won't help you solve the cluster problem, but it will help you regulate your hard disk space. Another way to free up space is to compress files you don't use often.

You can compress files or whole directories with DiskMapper. When you compress a file or directory, you end up with two copies: one that's compressed and one that isn't. You can set an option in DiskMapper to delete the uncompressed version, so the compression feels like a single-step process. When you uncompress, you also end up with two copies: one that's compressed and one that isn't. You'll want to keep this in mind if you're very short on disk space.

I was extremely pleased to discover that DiskMapper uses com-

pression that's compatible with PKZip, the popular shareware compression utility. It creates a compressed file with the .ZIP extension, and just to be sure, I uncompressed a DiskMapper file using PKUnzip. This is a great convenience, especially if you like to zip up files to share with someone else who might not have DiskMapper or you archive these files to tape where you might not have a copy of DiskMapper available.

You can delete files and directories from within DiskMapper. But you can hurt yourself with this tool if, for example, you delete the Windows swap file (with the .SWP extension).

DiskMapper runs under either Windows 3.x or Windows 95. It requires at least a 386-based processor, a 3.5-inch floppy drive, 4M of memory and at least 450K of free disk space for installation. You can run it from the floppy disk drive, which requires no hard disk space. ◀

Award-winning author Rohrbough received the "Best Nonfiction Computer Book" award for 1994. You can contact her at 75570.3235@compuserve.com.



REPORT CARD

DiskMapper

Micro Logic Corp.
(800) 342-5930
www.miclog.com

Price and Availability

DiskMapper has a suggested retail price of \$49.95. Contact the company for direct sales or resellers. Quantity discounts are available.

Remarks

DiskMapper got a yawn from me until I used it to look at my own hard disk drive. When you look at the stuff you live with everyday represented in a way that takes all the conceptual work off your shoulders, you'll appreciate this product.

Final Score

Good



Toshiba Tecra 730CDT

The Latest Notebook for Multimedia Professionals

BY DANIEL M. VERTON

With the introduction of the Tecra 730CDT, Toshiba America Information Systems Inc. has targeted government professionals who require advanced multimedia and communications capabilities in an easy-to-use mobile platform.

The Tecra 730CDT has three major enhancements over its predecessor, the Tecra 720CDT. Foremost is its incorporation of Intel Corp.'s 150 MHz Pentium processor with an integrated 256K L2 cache. Secondly, the 730CDT has improved its storage capacity with a 2.02G removable hard drive — the largest available on a mobile platform. Finally, despite the upgrades, Toshiba has managed to reduce the cost by more than \$450 to \$5,534 on the GSA schedule (GS-35F-3304D).

However, the Tecra 730CDT is slow. It ran slower than some of the 133 MHz Pentium notebooks we tested

in July. Its battery life is also limited to well under three hours.

For the 730CDT, Toshiba has stuck with several of the Tecra 720CDT's winning features, such as a 12.1-inch active-matrix LCD with 64K color support and 1,024-by-768-pixel resolution, a 6X CD-ROM drive, a 64-bit Chips and Technologies Inc. HiQVideo graphics controller with 2M of EDO dynamic RAM and an internal 32-bit PCI bus architecture. Its external PCI bus provides support to high-speed PC Cards, such as 100Base-T Fast Ethernet. Also, its 16M of EDO DRAM is expandable to 144M.

The Tecra 730CDT has retained a superior look and feel highlighted by an ergonomically designed palm rest that makes the unit feel like a natural extension to your hands — perfect for those long international flights. Toshiba continues to use the AccuPoint pointing device for mouse functionality and has positioned the mouse buttons on the palm rest with ease of use in mind. The unit's modular design allows the user to load a CD-ROM, a 3.5-inch disk drive or a second hard drive in the Select-Bay housing unit. For those of you wishing to use both floppy and CD-ROM drives, an external port is available.

Toshiba's multimedia features include Sound Blaster Pro-compatible internal stereo speakers and a microphone, a built-in 28.8 kilobit/sec V.34 fax/modem, and full-duplex speaker phone and telephone answering

machine capability.

Rounding out this powerful package is support for two Type II or one Type III PC Card, an Infrared Data Association 115.2 kilobit/sec-compatible infrared port, and a 240-pin docking connector and RJ-11 phone jack.

The Tecra 730CDT supports AVI and MPEG video files and also conforms to the new Zoomed Video stan-



Microplex Printer Server

Tiny Device Proves Ideal for Small Spaces

BY DENNIS MCGILLICUDDY

Canadian vendor Microplex Corp. is offering an alternative to a dedicated PC as a printer server. The small, simple Microplex M205/M206 single-connection printer server is a device that government sites with heterogeneous systems and constrained office space may find useful.

The Microplex printer server allows workstations to send jobs to a single printer over a network and offers simultaneous support for Transmission Control Protocol/Internet Protocol, Internet Packet Exchange/SPX (IPX/SPX), Ethertalk and Windows NT networks. This printer server is designed for use in sites where only one printer is needed, as opposed to sites where one printer server coordinates jobs among multiple printers. The Microplex server can be managed via Simple Network Management Protocol (SNMP). It plugs directly into the electronics connector, and the network connects to it.

This \$329 printer server is smaller than a pack of cigarettes (2-by-3-by-1 inches) and is just as light (.15 pounds), making it ideal for government applications where size and weight are critical, such as aboard ships or in combat areas.

The product's features include:

- Support for TCP/IP, IPX/SPX, Ethertalk and Network Basic Input/Output System (NetBIOS) over TCP/IP, SNMP and Simple Mail Transfer Protocol.
- Support for NetWare, AppleTalk, Windows for Workgroups, Windows 95 and Windows NT 3.5.

dard through its Type II PC Card slot. Digital audio support is available for MIDI and .WAV file formats.

The Tecra 730CDT also comes loaded with Internet, communications and system utility software. For Net surfers, the Tecra provides access to America Online, CompuServe, Netscape and the Microsoft Network. Also loaded is the Dow Jones Personal Journal, an on-line subscription service for selected *Wall Street Journal* editorials and news summaries. In addition, Toshiba provides magiCDisc v2.1 for playing audio CDs and Syncro Development Corp.'s Multimedia Connect for digital communications. Finally, SystemSoft Corp.'s CardSoft/16 and CardWizard are available for enhancing the

- Multilevel security.
- Autosensing of job/file format for ASCII to PostScript conversion.

The documentation only lists installation procedures for Windows NT 3.5, but my Ethernet network has a Microsoft Windows NT 4.0 server and a Windows for Workgroups client. My initial attempts to install the printer server via the standard NT 4.0 installation procedure failed. I ended up installing TCP/IP on NetBIOS on the NT server and client. To do this, I had to download the TCP/IP drivers for Windows for Workgroups (TCP32b.exe) from the Microplex World Wide Web site. This software should have been included in the package.

Once the TCP/IP was installed, I used the ARP program to install an IP address on the Microplex (Thinnet version). Then I accessed the device via Telnet to store more network configuration information, as indicated in the documentation. The documentation is good. It has clear, large lettering for easy reading and is extensive. However, I would like to see Windows NT 4.0 instructions added.

Once I was able to communicate with the printer server device on both the server and the client, I could install the printer using the print manager on the Windows for Workgroups client, following the instructions in the manual. This was very simple. I tried using a similar method on the NT 4.0 server, but I could not find the same windowing sequence. I ended up using the administration wizard to help me complete the printer server installation on the server.

The trickiest part of the installation was understanding the need to select a "destination" port when the printer was added, but it is all explained in the manual. After clicking my way around the printer setup in both WordPerfect and Microsoft Word, I was able to select the newly added printer as "\\m_040065\ld1pm on NE00". This name can be changed using the "Store" command.

Overall, it took about an hour to read the documentation and another hour to set it up on the Windows for

Windows 95 functionality of PC Cards.

We ran the Tecra 730CDT through Business Applications Performance Corp.'s SYSmark/32 benchmark for Windows 95 and were surprised by the slow results. Despite an overall SYSmark/32 rating of 77 on a scale of 100, the Tecra performed well in the areas of desktop graphics and spreadsheets, posting scores of 94 and 87 respectively. Its weakest scores were in word processing and database applications, with ratings of 70 in each category. In fact, the Tecra 730CDT was 50 percent slower in desktop graphics and 15 percent slower overall than Panasonic's CF-62 133 MHz Pentium notebook, which had a SYSmark/32 score of 89.

To test the Tecra's battery life, we ran the system through BAPCO's Battmark32 for Windows 95 and NT twice, configuring the system with slightly different power management settings on each run. On the first run, the system's power management features were set for full power, with the CPU at high speed and screen intensity at medium. The result was a Battmark32 score of 84 and a run time of 2 hours, 19 minutes and 56 seconds. Using the lower power settings for the second run, we were able to get 15 more minutes of run time out of the system and a Battmark32 score of 94. The above results demonstrate that by using the standard power saving features resident on the Tecra, it is possible to squeeze

Tecra 730CDT Benchmark Results

SYSmark/32	77
Desktop Publishing	70
Desktop Graphics	94
Desktop Presentation	77
Word Processing	70
Spreadsheet	87
Database	70

REPORT CARD

Microplex M205/M206 Printer Server

Microplex Corp.
(604) 444-4232
www.microplex.com

Price and Availability

This product has a suggested retail price of \$329. Contact the company for sales information.

Remarks

The Microplex is a simple product that sets up easily in Windows for Workgroups and, with a little effort, in a Windows NT 4.0 network. Performance on a small network is good, though it does slow the printer down slightly.

Final Score

Very Good

Workgroups client. Installing on the server, it took another half hour.

The printer speed on a 24-pin Panasonic dot-matrix printer was reduced by about 15 percent with the Microplex device. A four-page document took 122 seconds via direct connect. It took 141 seconds over the network. This slowdown is because of direct printing via TCP/IP and because a queue was not used. However, the company's technical support staff, which was helpful, told me that this could be corrected by using the NT server for spooling rather than going directly to the printer server. I was impressed by the fact that the first time I printed out a Word or WordPerfect document, there were no errors or garbage characters. A good sign. One thing I didn't like was that my word processor's keyboard-to-cursor performance was slowed considerably during printing.

Although it slows the printer slightly, the Microplex printer server is more useful than having a dedicated PC as a printer server, and it takes up less room. ◀

McGillicuddy is a network consultant with Trellis Network Services, Southborough, Mass.

extra life out of your system when on the road.

Overall, the Tecra 730CDT is a very capable system offering superior multimedia functionality and storage capacity. ◀

REPORT CARD

Tecra 730CDT

Toshiba America Information Systems Inc.
(800) 999-4273
www.toshiba.com

Price and Availability

Toshiba's Tecra 730CDT portable PC is available for \$5,534 on the GSA schedule (GS-35F-3304D).

Remarks

Despite its lackluster performance on our benchmark tests, this is still a powerful and flexible system. Impressive multimedia features, 2G of disk space and incredible screen resolution make the Tecra's 10 pounds worth the haul.

Final Score

Very Good

GroupWise 5.0

Innovative E-Mail for NetWare Users

► PATRICK MARSHALL

During 1996 we reviewed new releases of the three major groupware platforms: Lotus Development Corp.'s Notes, Microsoft Corp.'s Exchange and now Novell Inc.'s GroupWise. We used the same basic methodology to review all three packages. But because each package is unique — Notes, for example, has the most advanced database capabilities, while Exchange focuses on electronic mail — we emphasized different features in each review. To find out which product is right for your agency, dial up our Web site at www.fcw.com/pubs/gbb, where you can find all three reviews hot-linked to each other.

Despite Novell's dominance of the network operating system market, Novell's GroupWise has always lagged behind Microsoft and Lotus products in the local-area network e-mail market. This is not for lack of innovation. GroupWise was the first major LAN e-mail system to provide fully integrated group scheduling. It was also the first to offer the integration of voice mail to the e-mail inbox.

The just-released GroupWise 5.0 continues this tradition of innovation. Novell has integrated its SoftSolutions document management program into GroupWise, making it the first e-mail program to provide built-in document management. GroupWise 5.0 works with Novell's WebAccess to allow access to GroupWise inboxes via the Internet.

And with Version 5, GroupWise has shed its exclusive file-server orientation and now provides client/server-oriented services for remote-access users as well as LAN users connecting over Transmission Control Protocol/Internet Protocol (TCP/IP).

GroupWise will appeal most to NetWare shops because it uses NetWare Directory Services and NetWare Administrator as its management tools, so if you have NetWare expertise in-house, managing GroupWise will be a breeze. By the same token, if your office isn't standardized on NetWare, GroupWise will be an unlikely choice because NetWare and NDS require a steep learning curve. You can run GroupWise on most networks, but you'll still need to set up and configure at least one NetWare 4.1 server with NDS.

Installation/Configuration

If you aren't familiar with NetWare and NDS, you'd be wise to find someone who is. Either that or reserve quite a few hours for learning. The setup procedure is complex, and many of the program's dialog boxes are far from self-explanatory.

When you launch the installation program, GroupWise immediately pops up a screen offering to lead you through tips on organizing your GroupWise system, including how to estimate the number of servers you'll need, whether you should create multiple post offices and so on.

Not being NetWare-certified engineers, we stumbled a little in installing the program. First, configuring the connection to NDS

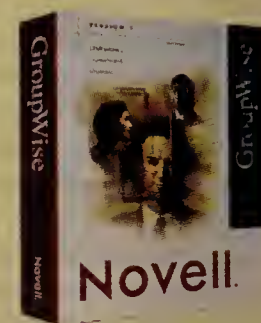
was problematic because we had more than one NDS tree. GroupWise could not extend one NDS tree to include the software, yet it provided no easy way to switch to another tree. We had to back out

of the installation routine, switch to another tree and then reinstall GroupWise.

Once we finally got NDS properly extended to include GroupWise, the installation program



REVIEW: GROUPWISE 5.0



GroupWise 5.0

Company		Novell Inc.	
		1555 N. Technology Way Orem, Utah 84097-2399 (800) 453-1267 www.novell.com	
WEIGHTING			
	Installation/Configuration	125 ★★	50.00
	GroupWise is relatively difficult to set up, mostly as a result of the complexity of NetWare and NDS.		
	General Operations/Ease of Use	125 ★★★	100.00
	High ease of use. Strong scheduling, flexible rules, built-in document management. Awkward formatting, limited document search tools.		
	Application Development	150 ★★	60.00
	No development tools ship with GroupWise 5.0. A forms designer and a views designer are available in separate packages.		
	Administration	150 ★★★	120.00
	Administration takes place through NetWare Administrator. You can administer all GroupWise servers from a single location, and NetWare Administrator provides flexible security and monitoring tools in an easy-to-use graphical interface.		
	Communications/Integration	125 ★★★	100.00
<div>Products receive ratings from excellent to unacceptable in certain categories. Scores are derived by multiplying the weighting of each criterion by its rating, where:</div> <div> ★★★★★ = Excellent = 1.0 Outstanding in all areas ★★★ = Very Good = 0.8 Meets all essential criteria and offers significant advantages ★★ = Good = 0.6 Meets essential criteria and includes some special features ★ = Satisfactory = 0.4 Meets essential criteria ☆ = Poor = 0.2 Falls short in essential areas ● = Unacceptable = 0.0 Fails to meet minimum standards or lacks a feature </div> <div> Scores are summed, divided by 100 and rounded down to two decimal places to yield the final score out of a maximum score of 10.0 (plus bonus). Products rated within 0.2 points of one another differ little. </div>	Documentation	75 ★★	30.00
	The only documentation is on-line help. While this is relatively extensive, it's not as effective as hard copy.		
	Support Policies	75 ★★☆	45.00
	The product carries a 90-day satisfaction guarantee. Novell offers free technical support for your first three incidents. After that you'll need to pay. Tech support hours are 6 a.m. to 6 p.m. Mountain time, but you can pay more for 24 x 7 support.		
	Technical Support	75 ★★★	60.00
	We had no trouble reaching Novell's knowledgeable support staff. Sometimes it wasn't clear if the problem was with GroupWise or NetWare.		
	Government Price (as of Oct. 23)	100 ★★★	80.00
	GroupWise's estimated GSA price of \$447 for five users and \$4,242 for 50 users makes the program's cost quite competitive.		
	Final Score	1000	6.45
	Remarks	GroupWise is a rock-steady e-mail system that highlights tight integration with Novell NetWare, built-in document management and Web access.	

installed a new version of NetWare Administrator. Unfortunately, the dialog boxes for importing NDS objects, migrating users from other systems and creating new document libraries were less than obvious.

To make matters worse, all of GroupWise's documentation is, on-line, so you have to flip back and forth between windows to accomplish the chore.

Once we got our bearings, it was quite easy to create new users as well as to import users via NDS and from older NetWare binderies.

Alas, the same cannot be said for getting the agents that handle replication, document library access and other operations running. Ultimately, it took a call to tech support to get things working. We then discovered that while GroupWise had installed the necessary agents, it had not started them. For a client that was connecting over the network rather than via TCP/IP, we also had to specifically grant rights to the directory where the document library was stored. In short, if you don't know NetWare, getting all the required agents running can be a major challenge.

Client installation, on the other hand, is a no-brainer. If you have a network CD established, you can install clients from that. Otherwise, you can locate client installation files directly on the GroupWise server. Either way, installation is fast and uncomplicated. The only real choice is whether you want to perform a standard installation, which requires 24M of memory, or a workstation installation, which launches GroupWise from the server and requires only about 5M of local disk space.

We rate GroupWise satisfactory for installation and configuration.

General Operations/ Ease of Use

While setting up GroupWise may be a challenge for the administrator, using the program's client software is quite the opposite. For the end user, GroupWise is simple to learn and employ.

The client interface looks a lot like Windows Explorer, with folders appearing in a vertical window on the left and the contents of the highlighted folder appearing in a larger window on the right. You can also pop open a QuickViewer window across the bottom that will display the currently highlighted item. And a customizable toolbar that runs across the

top puts all the program's tools close at hand.

In addition to e-mail messages, which appear either in your Inbox or Sent Items folder, GroupWise offers five other prefab folders: Task List, Calendar, Work in Progress, Cabinet and Trash. You can also create personal folders for storing items.

Just as with e-mail, Tasks and Appointments can be sent to others. Making an appointment for yourself requires you to address and send it to yourself. Then you have to click on either Accept or Decline when you call the item up.

Like Microsoft Exchange, GroupWise lets you create public folders for discussions. Messages in the folders can be called up by group members, and when they respond, you can track the message threading. But, unlike Exchange, GroupWise has no limit to the number of levels in a thread.

Control over creating documents is better than with previous versions, but it still isn't up to the likes of Exchange. You can use different fonts and colors within a message, but you'll have to click through several choices simply to change a color. The program includes a real-time spell-checker for correcting messages, but it only corrects misspellings that you specify. That is, if you type "document," the program will automatically change it to "document." But if you type "duckument," the error will not be caught as a misspelling unless you run the full spell-checker program.

You can attach files to items you're sending as well as embed OLE objects, and GroupWise offers strong controls over how sent messages are handled. Specifically, you can require receipts, either by mail, immediate notification or both. Even better, you can separately specify notifications when the message, task or appointment is opened, accepted, declined or deleted. And in the case of tasks, you can also call for notification when the task is marked "completed."

It's unfortunate, however, that while you can set these options separately for e-mail, tasks and appointments, you cannot vary them for individual messages. If you want to change the settings for a specific message, you have to click on the Properties button.

One of the major new features of GroupWise 5 is its built-in document management tools, which used to be sold as SoftSolutions Documents. These tools, which

are stored on the server, are listed in the Cabinet folder. You can create new documents as well as import existing documents into the library. Users, if they've been given appropriate rights, can check documents out and create new versions. The system administrator can monitor the status of documents, including when an item was changed and by whom.

While you can search for documents by specifying which fields to search, including author, subject and so on, you won't find flexible search tools such as Boolean or proximity searches, which are provided by stand-alone document managers.

As with previous versions, GroupWise's scheduling is strong. The calendars are easy to navigate, and in addition to scheduling group meetings, you can also schedule resources, such as conference rooms. All it takes is a click of the mouse to search another user's calendar for free time.

GroupWise offers a flexible rules feature that allows you to automate such chores as managing your folders and responding automatically to items when you're gone. The only real complaint about the program's rules feature is that you can't schedule rules to run at a set time. You can, however, set a rule to run either automatically, which means it's running all the time, or manually, which means it will only run when you specifically trigger it. The rules run on the GroupWise server, which means that they're working even if you're not logged in.

Finally, GroupWise allows you to designate proxies who are authorized to access and operate on items in your mailbox. The program gives each user the ability to control whether proxies have the right to read, write or both on each category of item. You can also have the proxy subscribe to your alarms and notifications.

GroupWise earns a score of very good in general operations/ease of use.

Application Development

Novell has opted not to include any application development tools in the standard GroupWise package. You can't, for example, create databases as Lotus Notes allows. Nor does GroupWise come with a built-in forms designer. If you want to create custom message forms, you'll need to purchase the InForms package, which costs \$495 for a five-user license.

Even if all you want to do is

create custom views of GroupWise folders, you will have to turn to a separate package. Novell also decided to move the View Designer to Novell's Software Development Kit, a subscription service sold separately.

Because GroupWise's application development tools are all separate products, the program is held to a score of satisfactory.

Administration

GroupWise scores very high in this category, thanks primarily to the new 32-bit version of NetWare Administrator that is used to manage the GroupWise system as well as the NetWare network. One big plus is that the NetWare Administrator allows you to manage all GroupWise servers from a single location. Another big plus is that you can add GroupWise and NetWare users at the same time and in the same interface.

The graphical interface makes it a snap to add users, add custom fields to user profiles, synchronize GroupWise systems and do housekeeping on databases.

It is also through NetWare Administrator that you monitor the status of your administrative and message transfer agents. The agents allow you to track virtually any kind of information you may want, including traffic flows, queues, server connections and alerts. The only knock on these tools is that they offer no graphical representations of agent statistics as they change over time. All agents, however, are SNMP-enabled, so you can use third-party monitoring programs or applications to create graphs.

GroupWise also relies primarily on NetWare for security. It is NetWare that provides password protection. And it is NetWare that governs users' access to directories and other network resources.

In addition, GroupWise offers its own tools to control access to GroupWise resources. To begin with, as noted above, users have detailed control over what proxies can do. And the system administrator can also control users' access to document libraries by right-clicking on the library icon in the NetWare Administrator. By default, all users have six types of access rights: view, change, add, delete, designate official version and reset in-use flag. If you choose to limit any of these rights, you can then grant them individually to specific individuals or groups.

Plus, all messages are encrypted from the moment you send

them until the receiving client pops them open.

We rate GroupWise's administration tools as very good.

Communications/Integration

GroupWise is also strong in connectivity. The program will work over virtually any network, and clients are currently available for all versions of Windows: 3.1, 95 and NT. Also, an Apple Computer Inc. Macintosh client is under development, as are three Unix clients. Novell does not plan to ship clients for DOS or OS/2.

The program supports TCP/IP, IPX for NetWare and NetBeui as well as other file-based transports supported by Windows NT.

GroupWise also offers extensive gateways for connecting to Novell systems. Eighteen are provided with the package, including all the usual suspects, such as SMTP/ MIME and X.400. If you purchase the WebAccess package, you can access your mailboxes using a Web browser. (A five-user license costs \$75.) A bundled-in asynchronous gateway lets you use the same client remotely via dial-in that you use on the LAN.

It's also worth noting that third-party products are available for integrating fax and voice-mail capabilities. GroupWise's universal inbox allows all types of messages to be retrieved from one inbox.

GroupWise earns a score of very good in communications/integration.

Overall

GroupWise 5.0 is an integrated e-mail system that offers a universal inbox as well as built-in document management. The system benefits from the stability and security of NetWare 4.1 and from the flexibility and ease of management of NDS. GroupWise also offers excellent gateway support, including Web access.

If you have a NetWare shop and in-house NetWare expertise, GroupWise is a very good deal. Bear in mind, however, that application development tools cost extra and that installing and configuring GroupWise can be a real chore if you aren't already familiar with NetWare and NDS. ◀

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Marshall is research manager at the InfoWorld Test Center.

Visit our Web site, *FCW Gateway*, at www.fcw.com/pubs/gbb, where hotlinks to the other groupware reviews are available for your convenience.





V.I.P.C

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Sample GSA Configurations

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- 256K Pipelined Burst Cache
- Vivitron™15 (13.9" viewable) Color Monitor
- PCI Local Bus Graphics Accelerator with 1MB DRAM
- 1GB EIDE Hard Drive
- 3.5" Diskette Drive
- 8X CD-ROM Drive
- 7-Bay Mini Tower Case
- 104+ Keyboard
- Microsoft® Mouse 2.0
- MS Windows® 95
- MS Office 95, Professional Edition
- 3-Year Limited Warranty*

\$1,908

G6-200

- Intel 200MHz Pentium Pro Processor
- 32MB EDO DRAM
- 256K Internal Cache
- Vivitron17 (15.9" viewable) Color Monitor
- 2MB SGRAM
- 2GB SCSI Hard Drive
- 3.5" Diskette Drive
- 8X SCSI CD-ROM Drive
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Encryption Software

4 Packages That Secure Your Data

► GREGORY S. SMITH

What if the sensitive information on your computer fell into the wrong hands? Could a disgruntled employee, a thief making off with your laptop or even a determined adversary cause harm to your agency?

If you want to keep your private files private, consider buying one of the four desktop encryption products reviewed here. These packages are easy to use and support, and better still, they'll keep your sensitive data safe.

If there's an axiom to the Information Technology Age, it's that information is power. So what are you doing to make sure you don't empower the wrong people? For most computer users the answer is, next to nothing.

Cryptography, the science of scrambling a message so that only authorized people can decode it, is something of a black art. Because the underlying technology is so complex, many agencies have trouble making informed decisions about buying and using encryption software.

Worse still, there is no such thing as a completely secure computer or an impenetrable cryptography system. But don't despair; there are some simple techniques for thwarting all but the most sophisticated attacks. The four desktop encryption products we reviewed are good starting points.

How Encryption Products Work

Encryption products differ widely in how they work and what they protect. All these products do essentially one thing: They encrypt files on your computer. If someone gets access to your computer, he won't be able to decipher files you've encrypted. Once files are encrypted, you can use an e-mail program to send them to someone, or you can put them on a network for others to retrieve. Whoever receives a copy will need the same encryption program in order to decrypt it. You will need to encrypt the file for each of the recipients using their encryption key or, in the case of RSA Secure, all users

(yourself included) need to agree on a password to encrypt or decrypt files.

At the core of all the products we reviewed is a secret-key cryptography system. Simply put, a secret-key cryptography system uses a secret code to transform your data into gibberish. If the encryption algorithm does a good job of scrambling the data, the only practical way to restore the original file requires knowing the secret key used to encrypt the file. Because the algorithm uses the same key to encrypt and decrypt the data, these systems are often called symmetric-key systems.

The linchpin of the process is the algorithm, which must make it impossible to decipher the scrambled file without knowing the secret key. Even a bad encryption algorithm is enough to stymie a typical user, but cryptographers can employ a number of attacks to break an algorithm.

How do you know whether an encryption algorithm is solid? Unless you're a professional cryptographer, you can't judge for yourself. Instead, most of us rely on the judgment of cryptographers. Some encryption algorithms, such as the Triple Data Encryption Standard (DES), have undergone years of scrutiny, and there is a consensus among cryptographers that the algorithms are secure. More recent algorithms, such as International Data Encryption Algorithm, have also undergone considerable scrutiny and are generally considered secure.

Some cryptographers choose not to publish their

AT A GLANCE

Encryption Software

Pricing

Depends on the number of user licenses purchased (single, multiple or corporate bundle). Only Symantec Corp. and AT&T are available on the General Services Administration schedule. Prices range from \$43 to \$144 on the GSA schedule for a single-user license and \$79 to \$586 for various license bundles.

What's Selling

Federal agencies are very interested in private- and public-key cryptography and digital signatures.

Where to Find Bargains

In general, savings of 40 to 50 percent are possible with larger user license bundles — that is, 500 or more copies.

What to Specify

Look for a package that can support a flexible data security plan, including "on-the-fly" encryption and mobile/remote users. You may also want a package that supports a hybrid network architecture.



cryptographic technique. If other cryptographers can't study the algorithm, then there is little basis for trusting the algorithm. In general, if an author hasn't published the algorithm, don't trust it. Unfortunately, the federal government's Skipjack algorithm — found in Capstone and Clipper chips — falls into this category, but you may have no choice in the matter. Similarly, RSA Data Security Inc.'s RC4 cipher, on which RSA Secure relies, has been published only under a nondisclosure agreement. Is RC4 secure? Probably. RSA is certainly well-respected for its cryptographic expertise, and the limited peer review hasn't turned up any significant flaws. (At least, that's what RSA claims.) RC4 is also being used in such popular software packages as Lotus Development Corp.'s Notes, Microsoft Corp.'s Explorer and Netscape Communications Corp.'s Navigator.

If you're just trying to protect data for your own use, then an encryption product simply derives a secret key from your password. (Hopefully, you chose a long password that no one could guess.) If you want someone else to decrypt the file, however, you need a way of transmitting the secret key — or a password from which the secret key is derived — to someone else.

Most products turn to public-key cryptography to solve this problem. Public-key cryptography — such as RSA's system, a de facto standard — generates two large numbers for each user. Data encrypted with one of these keys can only be decrypted with the other key. Therefore, you can publish one number, the public key, and keep the other number secret. When someone encrypts data with your public key, the only way to decrypt it is with your corresponding private key.

Each time you encrypt a file with a public-key system, the software goes through a process that goes something like this. First, the software generates a secret key, usually a random number. Because this random number is used only one time, it is often referred to as a session key. The software then feeds the session key to a secret-key encryption system such as Triple DES or IDEA, which scrambles the file. To decrypt the file, the session key is needed, so the software looks up the public key of the recipient and uses that number to encrypt the session key. The software then bundles the encrypted session key with the separately encrypted data. To decrypt a file, the software just reverses the process. First, the software retrieves your private key, which corresponds to the public key used earlier. With the private key, the software recovers the session key. That session key allows the software to restore the original file.

Some encryption software includes another basic feature: digital signatures. Digital signatures verify that a file has not changed since someone signed it, and they give the recipient a way of verifying who signed it. The two prevailing digital signature schemes are one offered by RSA and the Digital Signature Standard, supported by the National Institute of Standards and Technology. These schemes use one of two standard techniques — MD5 or the Secure Hash Algorithm — to generate a number called a hash or message digest, which is rather like an elaborate checksum. MD5 and SHA make it very difficult to find two files that would generate the same message digest. At this point, the two prevailing schemes differ a little. RSA's signature mechanism simply encrypts this hash value with your private key. DSS also uses the originator's private key and a message digest to compute a signature.

When someone receives a digitally signed message, the hash value for the received message is recomputed. The recipient then uses the sender's public key either to decrypt the original hash value — in the case of an RSA signature — or to generate new signature values, as in the case of DSS. If the newly computed value matches

THE CONTENDERS

- **AT&T's SecretAgent**, available on the GSA schedule. **Score: 7.74**
- **Pretty Good Privacy Inc.'s ViaCrypt PGP Business Edition**, available on the open market. **Score: 7.06**
- **RSA Data Security Inc.'s RSA Secure**, available on the open market. **Score: 6.09**
- **Symantec Corp.'s Norton Your Eyes Only**, available on the GSA schedule. **Score: 7.81**

the original, the recipient knows that the message hasn't been altered. (If it had been tampered with, the hash value would be wrong.) Also, the recipient is assured that only someone with access to the sender's private key could have signed the message.

The Right Encryption Strategy

Protecting your sensitive or confidential information requires more than just good software. You need to craft a security policy that protects you from whatever threats you perceive. If you choose weak passwords or leave copies of sensitive data unencrypted on some systems, no encryption software in the world will protect you. Unfortunately, none of the products we reviewed does an adequate job of addressing the big security picture.

Having developed a security policy, check out Symantec Corp.'s Your Eyes Only. The product is exceptionally easy to use, thanks to tight integration with the Windows 95 Explorer interface. It also offers nearly transparent encryption and decryption of subdirectories. It's our first choice for Windows 95 users, but the product does have two drawbacks worth noting. First, you can't digitally sign documents. Second, the product requires a password when you boot and after its screen saver has activated, but there's no way to force users to type in a password each time they decrypt files.

Government buyers should also consider AT&T's SecretAgent. It offers the broadest choice of public-key and secret-key encryption algorithms — including RSA and Triple DES — as well as both prevailing digital signature standards. Its Windows 3.x interface is easy enough to navigate and includes such handy features as automatically mailing documents to recipients through your VIM- or MAPI-compliant e-mail client.

Also worth a look is Pretty Good Privacy Inc.'s ViaCrypt PGP Business Edition, a Windows-based, commercial version of the popular Pretty Good Privacy shareware. It retains all the features that PGP is famous for, including sophisticated public-key management and the ability to sign documents without encrypting them. Unfortunately, the interface for most administrative chores is clunky, and it offers little in the way of automation.

RSA is one of the biggest names in desktop security products, but its entrant, RSA Secure, sports few of the features we expected. There is no public-key cryptography — except for the emergency-access key — so you'll need another product if you plan to share encrypted files with others. And RSA Secure relies exclusively on RC4 encryption. While most experts believe that RC4 is a good algorithm, RSA has only released the algorithm under nondisclosure agreements, making it difficult to develop consensus on the algorithm's strength. To RSA's credit, RSA Secure is the only product that allows you to split the emergency-access key up over several trustees.

Norton Your Eyes Only

Symantec's Norton Your Eyes Only is the only Windows 95 product in the review. Except for administrative chores and logging in, the product relies entirely on extensions to the Windows 95 Explorer shell, which makes it particularly easy to use.

Your Eyes Only allows users to choose from a number of popular symmetric-key encryption algorithms: RC4, RC5, Triple DES and Blowfish. It then encrypts the secret key using RSA's public-key cryptography. The product does not, however, support digital signatures.

More so than any other product we've looked at, Your Eyes Only protects everything on your system. And its automatic encryption and decryption help keep those files from prying hands. When you boot a system protected by Your Eyes Only, you need to log in. In addition to the primary user, you can set up secondary users who can share your system but who cannot access many of the management features of Your Eyes Only.

We looked at the Administrator version of Your Eyes Only, which includes a lot of essentials for successfully managing security in an organization. The administrator generates keys, maintains the user and certificate database and can automatically distribute the application — and updates — to users on the network.

Installation

Installing the Administrator version of Your Eyes Only is

HOW WE TESTED

Encryption Software

We installed each of these products on our Windows NT network, which has a mix of Pentium-based clients running Windows 95 and Windows 3.11. All the encryption products performed well; the only significant delay occurred when generating keys during the installation process.

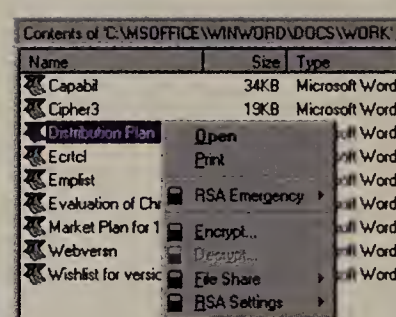
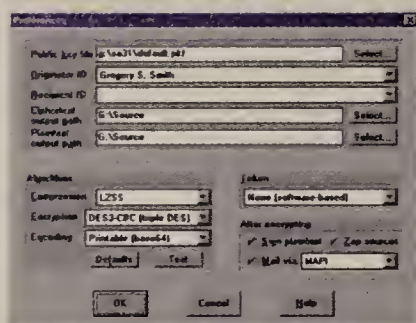
Even at key lengths of 1,024-bits, day-to-day operations were speedy.

Given that all the products support at least one well-regarded encryption algorithm, we focused on ease of use and product features. We also looked for problems with the standard cryptographic features, such as encrypting, decrypting, key management and digital signatures.

We looked at administrative features from the perspective of an IS manager charged with enforcing an organization's security policy. We considered network support for public-key databases, administering key-certificate authentication requirements, disabling administrative features in the clients that might conflict with the organization's policies and different techniques for ensuring password integrity. We also looked at emergency-access keys' storage and access. We gave special consideration to products that allow the emergency-access key to be split up among several trustees.

We then looked at each client in two scenarios. The first was simply encrypting files for personal use. Here, public-key cryptography offers little advantage over secret-key mechanisms, but automatically encrypting files after use or during shut down earned extra points. Then we examined the products for features that allowed users to share documents over networks or e-mail systems. Public-key support, efficiently encrypting session keys for multiple recipients and bonuses such as tight integration with e-mail packages or digital signature support earned higher scores.

Encryption Software Compared



SecretAgent 3.14

ViaCrypt PGP Business Edition 4.0C

RSA Secure 1.1.1

Norton Your Eyes Only

Company	AT&T Government Markets Security Software P.O. Box 20046 Greensboro, N.C. 27420 (800) 203-5563 www.att.com	Pretty Good Privacy Inc. 555 Twin Dolphin Drive Suite 570 Redwood Shores, Calif. (800) 536-2664 www.pgp.com	RSA Data Security Inc. 100 Marine Parkway Suite 500 Redwood City, Calif. 94065-1031 (415) 595-8782 www.rsa.com	Symantec Corp. 10201 Torre Ave. Cupertino, Calif. 95014 (800) 441-7234 www.symantec.com
Installation	75 ★★★ 47.00 It has a simple setup routine, but it doesn't prompt you to back up your key file.	★★★ 47.00 Easy to set up but fails to back up your private key.	★★★ 47.00 The two-step process is well automated, but you need to make scads of floppies, which is a bit laborious.	★★★ 47.00 Administrator version includes a network distribution program. Lots of administrator options make the install process more complex, but you get more control over clients.
Administration	125 ★★★ 78.00 Doesn't offer centralized control of user settings but does offer a host of encryption options through a simple-to-use interface.	★★★★ 94.00 Supports a simple emergency-access key and a sophisticated key-certification mechanism.	★★ 63.00 Supports only one administrative option, an emergency-access key which can be split among several trustees.	★★★★ 125.00 Gives administrators almost total control over clients, but it can't split the emergency-access key among several trustees.
Protecting Data	225 ★★★ 141.00 Simple interface plus macros for popular software make encrypting easy. Lacks the ability to automatically encrypt files, though.	★★★ 141.00 Simple interface supports signing with or without encryption. No automated tools, however.	★★★★ 169.00 Easy-to-use File Manager extensions work on both Windows 95 and Windows 3.x.	★★★★ 225.00 Nearly transparent operation with its automatic encryption of folders. Except for administrative chores, Your Eyes Only relies on the Windows 95 Explorer interface.
Sharing Data	225 ★★★★★ 225.00 The public-key system works well and will even automatically mail a document to its recipients.	★★★ 169.00 Easy-to-use, public-key system that supports popular e-mail encoding format. Won't automatically mail a document but will output ASCII-encoded files to the clipboard.	★★ 113.00 No public-key crypto system for sharing files. You must rely on a shared secret key.	★★★ 141.00 Easy to use but lacks the automated features of its rivals. No support for digital signatures.
Documentation	100 ★★★ 75.00 Manual offers extremely detailed technical discussions and covers most procedures in a step-by-step format.	★★★★ 75.00 Easy-to-read manual, but it lacks a discussion of creating an encryption policy.	★★★ 63.00 Concise, easy-to-read manual; lacks any discussion of cryptographic algorithms or security policy.	★★★★ 75.00 Very well-written manuals but not much discussion of security policies.
Support Policies	50 ★★★ 31.00 90 days 90 days (except for large orders) Yes No 8:30 a.m. - 5:30 p.m. M-F (CST)	★★★ 31.00 90 days 30 days Yes No 8 a.m. - 5 p.m. M-F (MST)	★★★ 31.00 90 days No 90 days Yes 8 a.m. - 9 p.m. M-F (EST)	★★★ 31.00 60 days Yes 90 days No 7 a.m. - 4 p.m. M-F (PST)
Money-back guarantee				
Free support				
Toll-free line				
Tech support hours				
Technical Support	50 ★★★ 38.00 Extremely knowledgeable technicians with short hold times.	★★★★ 38.00 Helpful technicians were easy to reach.	★★★★ 31.00 RSA is in the process of transferring tech support to its parent company. During the transition, technicians were hard to reach but very helpful.	★★ 25.00 The technicians knew the product well, but we were on hold for 10 minutes at one point.
Price (as of Oct. 28)	150 ★★★ 113.00	★★★★ 113.00	★★★ 94.00	★★★★ 113.00
Single-User Price	\$144	\$149	\$129	\$43 (without admin tools)
Bulk Price	\$440 (5 users)	\$390 (5 users)	\$495 (5 users)	\$586 (10 users)
Reseller	N/A	N/A	N/A	Softmart
GSA No.	N/A	N/A	N/A	GS-35F-4252D
Phone	(800) 203-5563	(800) 536-2664	(415) 595-8782	(800) 628-9091
Final Score	1000 7.47	7.06	6.09	7.81
Remarks	SecretAgent is aimed at the federal government user and supports virtually every federal security guideline. It's geared for sharing data with others, but local files can be kept private.	ViaCrypt PGP offers one of the best public-key crypto systems on the market, although configuring and managing the product is cumbersome. Still, it's a solid encryption package and worth a look.	RSA Secure is a snap to use and features automatic file encryption, but it doesn't support public-key cryptography, forcing users to distribute secret passwords in order to share files.	For organizations looking for ease of use, Symantec has created an outstanding — and inexpensive — product. However, some security features, such as digital signatures, are missing.

Products receive ratings from excellent to unacceptable in certain categories. Scores are derived by multiplying the weighting of each criterion by its rating, where:

★★★★ = Excellent = 1.0 Outstanding in all areas
 ★★★ = Very Good = 0.8 Meets all essential criteria and offers significant advantages
 ★★ = Good = 0.6 Meets essential criteria and includes some special features
 ★ = Satisfactory = 0.4 Meets essential criteria
 ☆ = Poor = 0.2 Falls short in essential areas
 ● = Unacceptable = 0.0 Fails to meet minimum standards or lacks a feature

Scores are summed, divided by 100 and rounded down to two decimal places to yield the final score out of a maximum score of 10.0 (plus bonus). Products rated within 0.2 points of one another differ little.

Visit our Web site, FCW Gateway, at www.fcw.com/pubs/gbb, where hotlinks to the vendors mentioned here and recent news stories on encryption are available for your convenience.



a relatively complex affair. The software loading process is well-automated, but the administrator needs to go through the process of adding users, generating keys and assigning privileges. Having done that, you can configure Norton's software distribution agent to automatically load the configured software on your network clients.

Your Eyes Only gives administrators a tremendous amount of control over how users employ the product: setting password lengths and expiration or preventing them from adding secondary users to a workstation. Such power, however, makes installation more complex. Worse still, the list of network users isn't integrated very well with the list key-management database.

Symantec also includes an uninstall tool. Given the amount of time needed to sift through the various steps, we limit Your Eyes Only to a good score for setup.

Administration

It's easier to describe what Your Eyes Only Administrator doesn't do than to cover the gamut of supported options. It supports an emergency-recovering key, but there's no way to split access to that key among more than one trustee. The only other significant administrative feature it lacks is support for certificate databases other than its own. Your Eyes Only allows you to set expiring passwords and password minimum length and to restrict password reuse. It maintains a detailed audit log that you can prevent users from clearing. You can also limit the primary users' access to other management functions.

Symantec included a feature that may prove a lifesaver, but it is something of a double-edged sword. Unlike most products, Your Eyes Only keeps a copy of the users' secret keys in the administrator's key database. If a user forgets his password, the administrator can issue a one-time password that allows the user to log in and get back to work. This also makes it possible for the administrator to log in as the user. If Your Eyes Only supported digital signatures, this ability to impersonate a user would seriously undermine confidence in those signatures. Given that the product doesn't support digital signatures, this backdoor may not concern most users.

The administrative tools of Your Eyes Only surpass those of the other products reviewed here and easily earn an excellent score.

Protecting Data

Your Eyes Only makes protecting files easy, almost transparent, to Windows 95 users.

When starting Windows, you log on to Your Eyes Only with a name and password. You encrypt, decrypt and securely delete files — Symantec claims compliance with the Defense Department's file-erase specification — by right-clicking on the file and choosing the appropriate action from the pop-up menu.

You can set directories to automatically encrypt their contents so that only you and others that you authorize can see the contents. When you open a protected file, Your Eyes Only automatically decrypts it — assuming, of course, that you have been granted access to the file by the person who encrypted it. Setting this up is as easy as right-clicking on the file and choosing from a list of users who should get access.

You can also define secondary users for your computer. Secondary users can log in and see files that you have authorized them to use, but they cannot change most of your local configurations. Guests can log in, but they cannot open any encrypted files. Symantec bundles a boot-lock mechanism — which prevents unauthorized users from starting the computer — and a

screen-saver lock to keep others from using the system while you're away. Despite the presence of a screen saver, Your Eyes Only leaves your data exposed to an intruder who has access to your computer after you've logged on. Your Eyes Only has no way to force you to type in a password every time you need to access a file; you only enter the password when you log on or when you deactivate the screen saver. While most users don't worry too much about this sort of attack, some agencies may find relying on the screen saver for security too lax.

It's hard to imagine an easier product to use to secure your data. Your Eyes Only earns an excellent score for protecting data.

Sharing Data

Like other public-key crypto systems, Your Eyes Only makes it as easy to encrypt files for other people as it is to encrypt data for your own use.

Your Eyes Only doesn't support converting binary files to an Internet-friendly format, such as base64, nor will it automatically mail a file after encrypting. Frankly, the lack of a base64 or similar encoding scheme isn't terribly important, given that most mail systems can do that automatically, but the lack of digital signatures is disappointing.

The inherent benefits of a well-implemented public-key crypto system is enough to earn the product a good score for sharing data.

Summary

Your Eyes Only clearly wins for ease of use. The product is elegantly integrated into the Windows 95 user interface, and its automated encryption encourages users to protect all sensitive data — even data they frequently access.

Unfortunately, Symantec's implementation does raise some security concerns, particularly in not requiring users to enter their passwords after logging in. But that's a classic trade-off between security and ease of use. Many organizations may prefer the easier-to-use approach; for them, Your Eyes Only is an outstanding choice.



ON THE HORIZON

Keys: How Large Should They Be?

► GREGORY S. SMITH

One common question for buyers is, what size encryption key do they need to ensure security? Key size is important because it determines how many possible keys there are to choose from. The more keys that are possible, the longer it would take an eavesdropper to try every key while searching for the right one. Thwarting this sort of guessing-game attack is one reason for choosing a large key size.

The Data Encryption Standard (DES), which is the aging government standard, uses a 56-bit key. This is probably too short for today's use, but Triple DES, which uses the DES algorithm three times with two different passwords, uses a 112-bit key and is generally considered secure. As used in today's software, other symmetric, or secret-key, algorithms — such as IDEA, RC4 or RC5 — use 128-bit keys. If you're using a well-respected symmetric algorithm with a 128-bit key, you should be in good shape.

AT&T SecretAgent 3.14

SecretAgent offers a host of standards to choose from for key generation, encryption, digital signatures, compression and encoding. While some users may be overwhelmed by the choice of standards, AT&T provides helpful advice for sifting through them all.

SecretAgent relies entirely on public-key cryptography for key management. Users choose from RSA or Digital Signature Algorithm (DSA) keys in either 512- or 1,024-bit lengths and can share public-key databases with other users across a network. In addition, SecretAgent offers users the choice of DES, Triple DES or AT&T's own encryption algorithm, EA2. SecretAgent also supports hardware tokens such as the Fortezza card or Datakey Inc.'s Smartcard. Of course, sites using SecretAgent with the Fortezza card rely on the card's Skipjack encryption rather than any of the three algorithms provided with SecretAgent.

If you save files locally or share them across a network, you'll probably just store the encrypted data in binary form. SecretAgent can automatically encode data in base64 or hexadecimal representations if you're relying on Internet mail or if you need ASCII-based encoding for any other reason. In addition to encryption, SecretAgent can sign your documents with DSS, although there's no way to sign documents without encrypting them.

AT&T also sells versions of SecretAgent that prevent users from generating their own keys and that also support an emergency-access key.

Installation

Installation is straightforward, thanks to a simple setup routine. We'd prefer that the manual spell out all the configuration steps, such as key generation, in one place rather than referring you to the on-line guide or part of another chapter. Likewise, the software should force users to back up their private keys because losing a private key could prove disastrous. The lack of an uninstall routine is a bit of a nuisance. Still, the process was relatively simple. We rated SecretAgent's installation good.

The key size for public-key encryption, however, is much larger. This doesn't mean that public-key cryptography is safer, just that it works differently. In fact, RSA Data Security Inc. now recommends a minimum key length of 768 bits for its public-key system. Key lengths for public-key cryptography are longer because the nature of the attack is a little different. Unfortunately, longer keys require more time to encrypt or decrypt data. Most desktop systems — fast 486s or Pentium — can use 1,024-bit keys fast enough that they are the preferred standard.

The U.S. government restricts the exportation of strong encryption products. None of the software in this review, for example, can be exported outside the United States or Canada. Several vendors have versions of their software that conform to the old, 40-bit export limit for symmetric encryption. Recently the government relaxed the limits, but all the products in this review continue to be restricted. Another recent change allows for the personal use of encryption software by legal U.S. residents who are temporarily abroad. There are a host of restrictions, however, and you should check with the State Department before attempting to take your encryption software with you when you travel.

Administration

There isn't much to administering SecretAgent. Users' preferences, such as automatically mailing encrypted files or changing encryption standards, are located in a single dialog box off SecretAgent's main screen. A separate key-management utility lets you merge public-key databases.

Like most of the other packages, SecretAgent doesn't give you many tools to enforce your company's standards. You can order the version that prevents users from generating their own keys, and SecretAgent can rely on external X.509 or other certificate servers.

Inherent in the product, however, are a raft of supported standards — everything from key generation to compression. While SecretAgent doesn't offer much in the way of centralized management, you shouldn't overlook the importance of letting organizations choose the security standards that are right for them. That's enough to boost SecretAgent's score to good.

Protecting Data

Encrypting files is easy. From the main screen, you simply add files to a list, click on the encrypt button and enter your pass phrase. You can manually remove the original file or have SecretAgent remove it automatically after encrypting. (AT&T claims compliance with DOD standards for erasing files.)

The program is actually a Windows 3.x executable, but it runs fine under Windows 95. However, it runs without the niceties of Windows 95, such as common dialog boxes for locating files.

Unlike some packages, Secret Agent has no facility for automatically encrypting files when you shut down, but it does come with macros for Word for

Windows and WordPerfect that allow you to encrypt files from the programs' menus or toolbars. Despite the lack of automation, the interface is easy and earns a good score.

Sharing Data

SecretAgent is clearly geared toward corresponding with others. First and foremost, its public-key database makes encrypting documents for someone else's review a snap. The database is hardly sophisticated, but it gets the job done.

It will automatically send documents through either VIM- or MAPI-compliant e-mail packages — a very nice touch. It will automatically sign encrypted documents and encode them for MIME format messages, although most e-mail products will do that for you anyway.

A more flexible public-key database would help, but you can use SecretAgent with other databases, including X.500 servers. All this is just as easy as encrypting local files, so SecretAgent earns an excellent score for sharing data.

Summary

AT&T aims this product squarely at federal government users and those who do business with the government. The company's support of just about every federal guideline for security and products such as the Fortezza card makes it stand out from the crowd. While SecretAgent automates virtually every aspect of sharing data with others, it is easy enough to use for keeping your local files private. The Windows 3.x interface does little for Windows 95 users, but the product runs fine on both platforms.

ViaCrypt PGP Business Edition 4.0C

ViaCrypt (now Pretty Good Privacy Inc.) licensed Phil Zimmerman's popular Pretty Good Privacy, or PGP, code and incorporated it in a more friendly Windows program than the original command-line interface. ViaCrypt PGP uses IDEA secret-key cryptography and bundles that secret key using RSA's public-key crypto system. You can choose any key length from 384 to 2,048 bits.

While ViaCrypt doesn't offer an administration program per se, ViaCrypt PGP Business Edition includes a variety of organizational controls, including an emergency-access key, a host of key-certification mechanisms and the ability to disable nearly any feature in the user's application.

Installation

ViaCrypt PGP's automated installation routine works well, and the documentation leads you through generating your public-key pair.

The program includes the ability to find a backup copy of your key pair, but at no point does the program prompt you to do so. In fact, the documentation contains nary a reference to the backup feature or its importance.

ViaCrypt PGP doesn't include an uninstall utility, but the manual details where to find all the program files.

While the program was easy to install, we limited the installation score to good because the package omitted forced backups.

Administration

The Business Edition comes with scant documentation for network administrators. The bulk of the document



BUYER'S TIP

Hardware-Based Encryption

► GREGORY S. SMITH

All the software packages reviewed here provide a generic sort of encryption: You encrypt a file, and it remains secure until you — or some other authorized person — decrypts it. It makes no difference whether the file sits on your hard drive or is transferred over a nonsecure network such as the Internet. The security remains the same.

Alternatively, some products protect data traveling between two computers. The software running on each computer sees normal unencrypted data, but anyone eavesdropping on the connection sees only encrypted data. Popular World Wide Web browsers and servers use techniques such as the Secure Sockets Layer to encrypt data traveling over the Internet. The data found on the client and the server remains unencrypted.

These products start a session by exchanging a secret key that is used only for one session, or connection. How they exchange the key varies, but they all share a mathematical trick that makes it difficult for an eavesdropper to figure out what the key is — generally using a variation of public-key cryptography. Having exchanged the secret key, the products then employ a secret-key encryption algorithm, such as the Data Encryption Standard (DES), to encrypt data before sending it, and the receiving station decrypts it before feeding it to an application. The next time the two devices connect, they

negotiate a new secret key using the same technique.

We looked at communication-based encryption products from Paralon Technologies Inc. and Cylink Corp. that take this process one step further by adding hardware devices to the authentication process. These vendors add a small hardware device between the modem and the computer, or, in the case of an internal modem, they divert the communications stream to the hardware device.

When two systems protected by such devices attempt to connect, their hardware automatically ensures that those two devices are allowed to connect because each device has a unique ID. The systems then proceed through authentication and key exchange. If someone attempts to connect to the system without the hardware key, the protected unit simply drops the call. Some vendors also offer hardware to protect your server, but you should use a software version of the hardware key on remote clients.

In Paralon's PathKey setup, each dial-up client and server needs a PathKey device — about the size of a large pack of cigarettes — which connects between the computer and the modem. (For internal modems, Paralon's communication driver redirects modem input/output to the external PathKey.) Before any two PathKeys can connect, you must program them with each other's ID. For small installations, you either directly connect the two devices so they can automatically exchange IDs, or larger installations can program the

devices from an administrator's PathKey/SA. Once programmed, the two PathKeys will intercept modem sessions, automatically authenticate or drop unauthorized calls, and perform DES encryption. All this happens without user intervention.



Cylink's SecureTraveler

Cylink's SecureTraveler for Windows and SecurePocket Traveler perform the same sort of transparent encryption. SecureTraveler, however, is an entirely software-based version that can connect to a SecurePocket protected station or Cylink's SecureGate, which is a dedicated dial-up server.

Hardware-based encryption products such as these add another layer of complexity and introduce administration

issues, but they do offer more protection. With these hardware products, it becomes more difficult for an intruder to impersonate a real user. Better yet, the products we tried were very easy to use at the client's end.

You can also add hardware tokens to other software encryption systems. AT&T's SecretAgent, for example, supports a variety of hardware authentication devices, including NSA's Fortezza card. While cards from different vendors vary in the services they perform, they all afford greater protection against impersonation. The user needs to know something — such as a password — and possess something — such as the hardware token — in order to be authenticated. That alone makes impersonation more difficult.

details every .INI file setting available for disabling different parts of the user's programs. Clearly, any knowledgeable user could edit the .INI file to re-enable features, but ViaCrypt does offer to hard-code PGP with your preferred settings.

ViaCrypt PGP supports both an emergency-access key and forcing users to rely on public keys certified by a given authority. These easily implemented features are very important, but we were dismayed that ViaCrypt's product can't split the emergency-access key among a number of trustees.

You can generate keys that can be used for encrypting, signing or both. Disabling, revoking and setting keys to expire are all easy to do.

ViaCrypt PGP also includes a flexible trust relationship tool that lets you identify completely or marginally trusted key authorities. You can set the minimum number of fully or marginally trusted authorities needed to accept a signed key certificate and similar thresholds for trusting keys. Some agencies won't want marginally trusted authorities, while others will be comfortable with this setup.

That said, ViaCrypt PGP's interface for configuring the software and managing keys is primitive. The program relies on a series of windows crowded with poorly organized buttons. The clumsy interface isn't debilitating, though, and the strength of the package's tools is enough to earn a very good score.

Protecting Data

ViaCrypt offers two interfaces for ViaCrypt PGP. The main program window includes buttons for encrypting, signing documents with or without encrypting, and decrypting. ViaCrypt PGP will overwrite the plain-text file automatically, if you like.

ViaCrypt PGP also includes a floating toolbar, called the Enclyptor, that offers the same basic choices but only operates on data in the Windows Clipboard. However, the Enclyptor doesn't let you drag and drop files as you can with the main program window.

Protecting the contents of your hard disk is easiest with the public-key cryptography engine, but ViaCrypt PGP allows you to rely on the underlying secret-key engine if you prefer. Of course, this circumvents the emergency-access key, so organizations may want to disable that feature.

The product doesn't offer any automated encryption facilities, but the basic engine is easy enough to use. We rate its tools for protecting data on your hard disk as good.

Sharing Data

ViaCrypt PGP's thorough integration of public-key cryptography makes sharing encrypted files with others easy. You can automatically add yourself to the list of recipients so that you can decrypt messages you wrote, and you can define groups of recipients. If you use Internet mail, ViaCrypt PGP will automatically create base64 ASCII messages. Of the packages in this comparison, ViaCrypt PGP offers the most flexibility in signing messages, with support for signing a message without encrypting it and appending the signature to the end of the message or storing it separately.

While ViaCrypt PGP won't automatically send encrypted output to your e-mail program, it will send base64 output to the Windows Clipboard, from which you can paste it into a message. The package also converts ASCII files to a platform-neutral form.

While ViaCrypt PGP lacks tight integration with e-mail packages, it has the mechanics of sharing data with others well-covered, so it earns a very good score for sharing data.

Summary

ViaCrypt PGP offers one of the best public-key crypto systems on the market. In particular, ViaCrypt PGP's sophisticated key management is hard to beat. Unfortunately, the interface for configuring and managing the product is very cumbersome, and it lacks the automated features of the other products. Still, it has the basics of encryption well-covered and is worth a look.

RSA Secure 1.1.1

RSA Secure provides simple file encryption for Windows 3.x systems. While you can run RSA Secure on Windows 95, you have to do so through the File Manager, a utility most Windows 95 users ignore in favor of the Explorer.

RSA Secure relies on RSA's RC4 stream cipher with a 128-bit key. You can't alter the key length, nor can you customize most other aspects of the software.

RSA clearly intended this product to protect an individual's files on a hard drive independent of how the organization manages data. While we applaud the freedom that this package grants users, we think it may be hard for a large organization to manage this product. Noticeably lacking from the product is any support for public-key cryptography, with the exception of the emergency-access key, which allows some number of trustees to decrypt files.

Installation

The program is easy to install, although you'll need to make quite a few floppies for a typical configuration. Most organizations will start with the administrator's system, on which you need to install the Emergency Access application. After adding a menu to the administrator's File Manager, you'll need to generate a key and a floppy for each of the individuals who control the split escrow key. Then you'll need to copy the RSA Secure disk that contains the user's application so that the emergency-access key can be written to it. Each user then follows the simple installation process, which adds the user agent to Windows' File Manager.

Both the administrator's and the user's distribution disks include an uninstall routine. Neither routine scans your hard drive for leftover encrypted files, although they do display a generic warning. They expect you to have backed up your key file before running the uninstaller.

Overall, installation earns a good score.

Administration

The only significant administration feature is decrypting files using the split administration key. When you attempt to decrypt a file using the emergency key, RSA Secure prompts you to insert the required number of trustee disks. Once the emergency key is recovered, you can decrypt a single file or have RSA Secure decrypt all files generated by a given user.

Changing the emergency-key password(s) or the number of trustees is simple and will be familiar to anyone who installed the emergency-access utility in the first place. Changing these settings, however, doesn't change the emergency-access public key, so your users' configurations need not be updated.

What administrative features RSA Secure includes are easy to use. Unfortunately, the product doesn't provide for routinely sharing files among workgroups, nor does it give administrators much control in enforcing security policies — for example, minimum password lengths. In fact, the only option administrators can control is whether users can disable emergency access when encrypting files. Without administrative tools, keeping an organization well-protected could prove a

burden. As such, we can't award more than a satisfactory score for administration.

Protecting Data

RSA Secure adds a single menu to the Windows File Manager. Choosing the Encrypt menu entry will prompt you for a password, which RSA Secure will optionally remember for a given period of time. After decrypting, RSA Secure deletes the original file. Decrypting is just as obvious.

Windows 95 users won't be thrilled with relying on the File Manager interface to use RSA Secure. Then again, once you've got the right directory open in File Manager, RSA Secure is delightfully simple to use. Of course, Windows 3.x users who are already familiar with the File Manager will need just a minute or two to master RSA Secure.

This Windows 3.x version allows you to automatically encrypt files or directories when you exit Windows and optionally decrypt them at start-up. The process is quite simple: You just add files to an Autocrypt list through the File Manager. Windows 95 users will have to wait for the Windows 95 version to enjoy the automatic encryption.

The basic features work well and in a very straightforward way. We'd love to see a more sophisticated interface, such as the floating toolbar that the Macintosh version sports, but Windows 3.x users should have no trouble getting the job done. RSA Secure earns a very good score for its simple but effective local encryption.

Sharing Data

Because RSA Secure doesn't support public-key cryptography, it forces you to distribute a secret password to people with whom you wish to share files. Having done so, you can encrypt files with this password as easily as you can encrypt your local data.

Without a public-key alternative, RSA Secure forces you to find some way to convey the secret password to your co-worker. While the user's manual points out that you should not use the same password for encrypting your private files, the software does not enforce it.

To share files with Windows users who don't have a copy of RSA Secure, you can choose to create an executable file that bundles the decryption engine along with the file, much like a self-extracting ZIP file. It's a great feature, and it's easy to use. The lack of a public-key mechanism limits RSA's score to satisfactory.

Summary

RSA Secure's simple interface makes using the product a snap. While Windows 95 users won't enjoy the automatic file encryption, the basic tools work well on Windows 95 and Windows 3.x. Unfortunately, without RSA's industry-standard public-key encryption technology, this product doesn't support sharing files very well. ◀

Smith is a free-lance writer and network consultant based in San Francisco.

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Secure Web Transactions

Is the Technology Ready for Prime Time?

► CHARLOTTE ADAMS

Can you conduct secure transactions over the Internet? That's the million-dollar question for government agencies. This article assesses the maturity of current products for securing Web transactions.

As stores and banks demonstrate successful transactions on the Web, government agencies are setting up shop too. But what about security? Are access control, encryption and certification technologies mature, accessible, affordable and user-friendly?

Experts say that all the products are available; it's just a question of integrating the products into an overall system. On the market today are security-equipped products and capabilities galore, including Web browsers and servers, authentication tokens, commerce software and firewalls. But many of these products are not easy-to-use, shrink-wrapped offerings. Most agencies will need a systems integrator to tie these products together and link them to legacy systems.

"All the technology pieces are there; it's just a question of integrating them," said Steve Kent, chief scientist for security with Bolt Beranek & Newman Inc. (BBN).

It's no longer a question of if, but of when, the Web will become a major commercial artery. The market, if nothing else, will drive security to acceptable levels. Where observers differ is over the degree to which security technologies have reached that point.

At \$518 million this year, on-line retailing — on both the Internet and private networks — is already significant, said Karen Eppert, an analyst with Forrester Research. Forrester anticipates a \$6.6 billion market by 2000. Internet-based Security First Network Bank has completed its first year of existence, and Carolina First Bank and AT&T have started up another operation, the Atlanta Internet Bank.

Most on-line retail activity is taking place using the Secure Sockets Layer protocol built into Netscape Communications Corp. and Microsoft Corp. Web browsers. SSL provides an encrypted link between Web clients and servers. The latest version of SSL, moreover, adds client-side authentication so that servers know who clients are, as well as the other way around.

The latest SSL release is also algorithm-independent, instead of depending on the ubiquitous RSA public-key encryption algorithm. Netscape is working on a version of its Web browser and server to support the Fortezza crypto card as an alternative to RSA, explained Peter Thorp, director of Netscape's

Federal Division. Previous SSL versions had been "very RSA-dependent," BBN's Kent said.

The Secure Electronic Transactions (SET) protocol, expected to reach the market in products next year, will allow end-to-end encryption of credit card numbers. Additionally, a new draft of the IP Security protocol has also appeared, and a standard key-management protocol has been nailed down, Kent said.

Meanwhile, Microsoft is developing an Internet Security Framework, including crypto application programming interfaces — the default will be RSA — certificate servers, authentication code and other facilities. An electronic wallet will ship with the next version of Explorer in early 1997.

When the new standards come together, Kent predicted, remote users will link to their private intranets over the Internet using "encrypted, integrity-checked and authenticated connections" with security "equal to or better than that with leased lines."

But public-key encryption is not that common yet, said Richard Rothwell, senior director of technology integration for the U.S. Postal Service. "There's no reason [completely secure transactions] can't occur. All it takes is someone to put together the right applications packages." But he stressed the need for "somebody to police transactions on the Internet."

The pieces are there, but "none of the products are scalable for large transaction volumes," said Mary McNally, director of commercial markets for integrator Computer Sciences Corp. Real-time management of large, volatile certificate privilege databases and firewall clusters isn't trivial. (Businesses can't realize economies of scale, she contended, without volumes in the millions of transactions per week.)

Furthermore, McNally said many of these products are untested. "The marketplace is not mature yet," she said. "There's much more sensitivity on the part of purchasers and product makers to attempt to put in more robust security. But there is the product cycle; things hitting the market won't be tested for six months to a year."

Nevertheless, "security technology is here or getting here awful fast," said Marty Wagner, General Services Administration associate administrator and Government Information Technology Services (GITS) Working Group

electronic commerce (EC) champion. The challenge is to use the technology in such a way "that it doesn't lead to a huge kludge of different ways of doing it," he said.

Government Activity

Federal agencies are moving aggressively into the area of secure Web transactions. There are 46 federal applications using public-key infrastructure (PKI) technology, more than half of which involve electronic commerce, according to Patty Edfors, the GITS champion for security and privacy.

Even the Defense Department is eyeing the Internet. "We realize that our electronic commerce must move toward being Internet-based," said Paul Grant, a special assistant for EC with the deputy assistant secretary for command, control and communications on assignment with GSA.

"We have the technology to do this now," Edfors said. The problem is that some "basic things still are not being done," she said, indicating areas such as systems security, implementation and training.

Edfors cited Energy and Transportation department electronic grant programs, a Small Business Administration electronic loan guarantee program and the Social Security Administration's Annual Wage Reporting System as PKI projects.

Internet software reseller

AT A GLANCE

Secure Web Transactions

Pricing

There are hundreds of different products, ranging in price from less than \$20 for a Web browser with SSL support to \$250,000 for high-volume commerce software.

What's Selling

Multiple products and solutions are being tested by both Defense and civilian agencies.

Where to Find Bargains

Prices on the GSA schedule are very competitive.

What to Specify

You'll need an integrator to help tie different products and capabilities together and link them to your legacy systems.



Selected Web Security Products Available on the GSA Schedule (prices as of Oct. 31)

Product	Description	Reseller	Price	Phone	GSA No./Contract
CheckPoint FireWall-1 v2.0	Unix firewall	GTSI	\$16,060	(800) 999-4874	NIH Electronic Computer Store
Haystack Labs Stalker Server v2.0	Unix auditing package	GTSI	\$15,345	(800) 999-4874	GS-35F-0131D
McAfee WebScan v2.0	On-line virus detection (Win95, WinNT)	GTSI	\$1,968*	(800) 999-4874	NIH Electronic Computer Store
Netscape Enterprise Server v2.0	For Unix; includes minor upgrades and 1 year of support	GTSI	\$773*	(800) 999-4874	NIH Electronic Computer Store
Netscape Navigator 3.0	With major and minor upgrades and 1 year of support	BTG	\$45	(800) 899-6200	GS-35F-2014D
Netscape Merchant Server	For Unix; with major and minor upgrades and 1 year of support	BTG	\$30,291	(800) 899-6200	GS-35F-2014D
Netscape Publishing Server	With major and minor upgrades and 1 year of support	BTG	\$30,291	(800) 899-6200	GS-35F-2014D
Open Market Secure WebServer v2.05	For Sun Solaris 5.4 and 5.5	GTSI	\$928	(800) 999-4874	GS-35F-2038D
Security Dynamics SecurID	Network access token	Security Dynamics	\$53 (3 years)	(800) 732-8743	GS-35F-3261D
V-One SmartWall	Firewall	GTSI	\$19,060	(800) 999-4874	GS-35F-4120D

*Expected GSA pricing

CyberSource uses readily available software to authenticate users at the National Imagery and Mapping Agency (formerly the Defense Mapping Agency) who log onto the company's site. CyberSource has a two-year software maintenance contract with NIMA to provide Microsoft products, said Kendall Fargo, government sales manager. The company will also distribute software electronically for the Interior Department with Indiana-based integrator CPI.

NASA Goddard Space Flight Center customers under the Scientific and Engineering Workstation Procurement I (SEWP) contract send in orders over the Internet, said Doug Hanson, implementation manager.

Another high-profile program is GSA's Advantage system, which offers agencies access to item selection and ordering via a Web front end. Advantage uses SSL, browser-based encryption. So far more than 100,000 items from 233 vendors are up, producing "a couple hundred thousand dollars" of business a week, said Teresa Sorrenti, program manager.

In other activity, the Census Bureau has acquired Netscape's Publishing System for the "on-line dissemination and charging for information," Thorp said. The software uses SSL and other security protocols to control access and provide confidentiality. The USPS has bought Netscape's Merchant and Publishing systems, he said. Netscape is also on the Integrated Computer-Aided Software Engineering pact, SEWP II and contracts with the Agriculture Department and the National Institutes of Health.

Census also has out a request for information on "putting decennial census [information]... on the Net" for sale, said Rick Garvin, director of system engineering,

integration and network systems with BTG Inc. The program is known as the Data Access and Dissemination System.

And the USPS is working on a trial electronic postmark, archival and authentication service that would provide security and integrity for electronic messages and transactions.

GSA is planning a "pilot for paperless federal transactions" in which the agency will function as a certification authority, said Dick Kemp, director of federal security infrastructure programs. The pilot, which falls under the National Performance Review, will use "federal algorithms," such as the Data Encryption Standard (DES) and the Digital Signature Standard, and will involve some commerce applications.

Products

With all these pilot projects under way, agencies need to know the maturity levels of Web security and commerce products. We've split the products into six categories: access devices, browsers/server software, certificates, commerce software, firewalls and security toolkits/software.

Access Devices

Access devices to computer networks and physical sites are commonplace and will become more so. In the 10-year-out view, GSA's Wagner hopes for a single, multi-purpose smart card per employee supporting identification, travel, small-purchase authority and both physical and virtual access control. The issues are not so much technological as they are legal and marketing, he said.

But a degree of consolidation may come sooner. The Federal Supply Service's recompetition of purchase and travel card contracts — worth as much as \$6 billion —

will encourage industry to look at multipurpose technology, according to Shirley Wilson, GSA's director of card technology. A request for proposals is expected next spring. A more short-term GSA project is developing a secure disk — a 3.5-inch floppy with an embedded chip — for Internet use.

A popular access token is Security Dynamics' SecurID card. The card costs from \$34, and the system's ACE server lists at \$2,450. Before the end of the year, ACE/Client for NT will include WebID technology to control access to information on corporate intranets from the Web.

Another approach is Dallas Semiconductor's miniature iButton digital accessory, which adds another layer to Web security.

Browsers/Server Software

Secure Web browsers and server software are widely available.

Netscape's Navigator 3.0, which has SSL 3.0, is on the GSA schedule with BTG, Government Technology Services Inc., Government Technology Inc. and I-NET Inc. for as little as \$17.95. I-CASE and SEWP II supply the software as well. Netscape's family of SuiteSpot servers, including FastTrack 2.0 (and higher) and Enterprise 2.0 (and higher) Web servers, also support SSL 3.0.

Microsoft's Explorer 3.0, introduced this summer, supports SSL 3.0. But the current NT Server 4.0, which includes Internet Information Server, supports only SSL 2.0. Support for SSL 3.0 is expected.

The National Center for Supercomputing Applications' XMosaic 2.6S Unix browser — currently in beta — supports Secure-HTTP (S-HTTP) and SSL 2.0 and 3.0, according to Adam Cain, a research programmer. The organization's latest Unix Web server, known as NCSA HTTPD 1.6 (also

in beta) also supports both versions of SSL and S-HTTP.

NCSA has also implemented digital signature capability on its server and browser through S-HTTP, which allows for nonrepudiation of Web transactions such as changes of address or signed Web pages. RSA-based signature capability is provided.

All the Mosaic browsers and the HTTPD server support message digest authentication, preventing passwords from being transmitted in the clear, where they could be picked up by others on the user's subnet, Cain said. Server software is available for downloading at hoo.hoo.ncsa.uiuc.edu/beta-1.6. NCSA, however, as a research organization, provides experimental releases, not commercial-grade product support.

Certificates

Another fundamental issue is certificate issuance and management for authentication and access control. The best-known certification authority house is VeriSign, which offers three levels of public certificates with ascending levels of trust. For those who want to set up independently, however, BBN and others sell certificate authority software rather than services.

Also, VeriSign is rolling out a "private-label" offering that customizes certificate services for large organizations. VeriSign's current infrastructure can scale to the "tens of millions" of certificates, product manager Bob Pratt said.

Commerce Software

Security-enhanced commerce software includes products such as Open Market Inc.'s OM-Transact, chosen by AT&T to launch a new Internet commerce service. Meant for high-volume, back-office transactions, the \$250,000 product claims customers such as BBN, MCI and British Telecom.

WebMate Technologies provides MallMaker and StoreMaker software, resting on its Webmate/Foundation platform. Priced at \$495, the Foundation toolkit implements extensions for electronic payment and an interface to SQL databases. Foundation also provides for access control and encryption. StoreMaker is priced at \$995 for the first year and \$750 for each subsequent year, and MallMaker is priced at \$750 per store per year.

SpaceWorks provides another commerce product suite linking the buyer to the seller's back office, eliminating middlemen. Priced at

\$100,000 to \$250,000, the suite of productivity software incorporates RSA technology, providing a "total application solution for the business-to-business segment," according to Liz Sara, vice president of marketing.

Firewalls

Another essential element is firewalls, which allow users to determine who can get into their Internet environment and under what circumstances. There are 60 to 80 vendors, and products vary widely in capabilities and prices.

Most firewalls provide basic defensive capabilities and can be tailored to meet user needs. Firewalls support SSL in that they are configured to let it pass through.

Popular products include CheckPoint Software Technologies Ltd.'s FireWall-1, V-One's SmartWall, Trusted Information Systems Inc.'s Gauntlet, Raptor Systems Inc.'s Eagle and Secure Computing Corp.'s Sidewinder. Prices vary from less than \$5,000 to more than \$50,000.

Security Toolkits/Software

Security toolkits are available from RSA and Terisa Systems Inc. to help agencies build their own secure Web transaction systems.

RSA's BSAFE is the "best-selling general cryptographic toolkit," at \$290 per developer copy, said Kurt Stammberger, director of technology marketing. It supports RSA, DES, Triple DES, RC2, RC4 and other cryptographic techniques. A new toolkit, BCERT, also at \$290, supports building certificate issuance and management applications. A SET developer toolkit is expected soon.

Terisa Systems provides higher-level Web client and server toolkits — priced at \$3,000 — enabling developers to integrate communications security, such as SSL and S-HTTP. SET will be added. Among the government customers are Lawrence Livermore and Sandia national laboratories.

For application-independent security, there are products such as HannaH by Unix security pioneer SecureWare Inc. With starter kits available for \$2,995 list, the software secures anything running over Transmission Control Protocol/Internet Protocol, according to company president David Luther. A DOD customer plans to deploy the technology for 30 to the "low hundreds" of users. ◀

Adams is a free-lance writer based in Arlington, Va.



ACQUISITION ANSWER MAN

Q. We're getting an ISDN line installed soon, and we have an NT 4.0 network. Can we put the ISDN device on the network and share it like you would a modem? And because ISDN has two B channels, could two people share it? Is the setup any different than a modem (for sharing), or do we need a router and other software?

Anthony Shields
Logistics Information Systems Administration
Army, HHC DISCOM

A. Yes, you can share an ISDN device on your NT 4.0 network. No additional software is needed; it's all included with Windows NT. Also, multiple users can access the ISDN modem over your network. However, splitting the channels is another matter. While it is possible to connect individually over each 64 kilobit/sec channel, configuration of the network is a bit difficult. We recommend installing additional ISDN lines and modems to your NT 4.0 RAS server.

Q. How would you suggest running two operating systems: Windows NT 4.0 and Linux? NT is the dominant system. Linux would be in occasional use, and it's not possible to put it on another machine. The setup is a 180 MHz Pentium Pro with a 3.5-inch, 3.2G Jaz drive. Our idea was to boot NT from the hard drive as usual and, when needed, boot Linux from the

floppy with the operating system residing on the hard drive as well.

Is this feasible, or is there another way?

Anthony Shields
Logistics Information Systems Administration
Army, HHC DISCOM

A. You can set the system up the way you described, but there is a better way by using the built-in boot manager in Windows NT 4.0. First, partition your drive into two sections. Next, install Linux on one partition and NT 4.0 on the other. NT 4.0 comes with its own boot manager that will let you select which operating system you want the computer to boot up with. The NT 4.0 documentation will show you how to set this feature up on your system.

Q. I have experienced two disk crashes during the past three years. I have an IDE-based PC like most of the users out there. I had to deal with downtime and pay for data recovery. The use of portable storage can solve the problem of backup, but what do I do about the downtime?

Mike Hertz
Received via e-mail

A. Data loss on PCs is a true dilemma for users. The expense and recovery time for drive crash-

es can be just as frustrating and costly to the end user as a full-network crash can be to a systems administrator. One solution is personal RAID-1 controllers. These devices will mirror your disk drive, thereby protecting your data with a fully redundant solution. With the cost of disk drives at an all-time low, you will find that having your own RAID device can be a lifesaver. These low-cost solutions, which typically run less than \$150, will save you money compared with having your data recovered from a single hard-drive crash — not to mention the cost of downtime. Vendors that manufacture these devices include Data Technology Corp., Milpitas, Calif., and Arco, Hollywood, Fla. For a recent review of DTC's Hard Copy, see our November issue of *Government Best Buys*.

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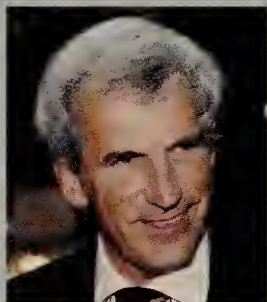
In which types of applications is computer security most important to you? What technologies do you find most useful to protect your systems and data?

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"Physical computer security. People are dialing in on ChatterBox (software by ChatCom Inc.), and Windows functions are disabled, so the only thing they can do is come into the application."

— Irene Macchia, management information system director with the Philadelphia Records Department, said system security issues are important now that the agency is putting information on-line.



"Public access. We use a [Post Office Protocol] mail server that allows us to sit behind a firewall provided by the Commonwealth of Pennsylvania."

— The Pennsylvania courts' administration office, where John Davenport is director, protects its documents by handling data requests by e-mail rather than letting the public search its databases on-line.



"We're involved with [Defense Department] systems, and we're very concerned about securing data, especially giving access to people."

— Lt. Col. Richard Jacob is looking into firewall technology for the Pennsylvania National Guard in his job as director of information management for the Department of Military and Veterans Affairs.



"We just bought software for student records management, and it's something we have to start building firewalls for."

— Judith Yoho is director of technology for the Keystone Central School District in Clinton County, Pa.



"In one of the applications for the Probation Department, there is a fingerprint verification technique that is being piloted."

— Daniel Moy, special assistant to the commissioner with the New York City Department of Information Technology and Telecommunications, said security concerns are becoming a major issue as agencies try to deliver more information on-line.



"We have a whole lot of applications that use the Internet. The issue that's more important is how we deal with [security] issues and policies and understand the environment."

— Peter McGeoch, assistant director with the Ohio Department of Administrative Services, said technology exists to manage security concerns, provided that policy questions are addressed.

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- For **tokens**: User friendly GUI for **Fortezza** Crypto Cards (Government MISSI Program), National Semiconductor iPower Cards, Datakey smartcards and other PCMCIA security tokens and smartcards

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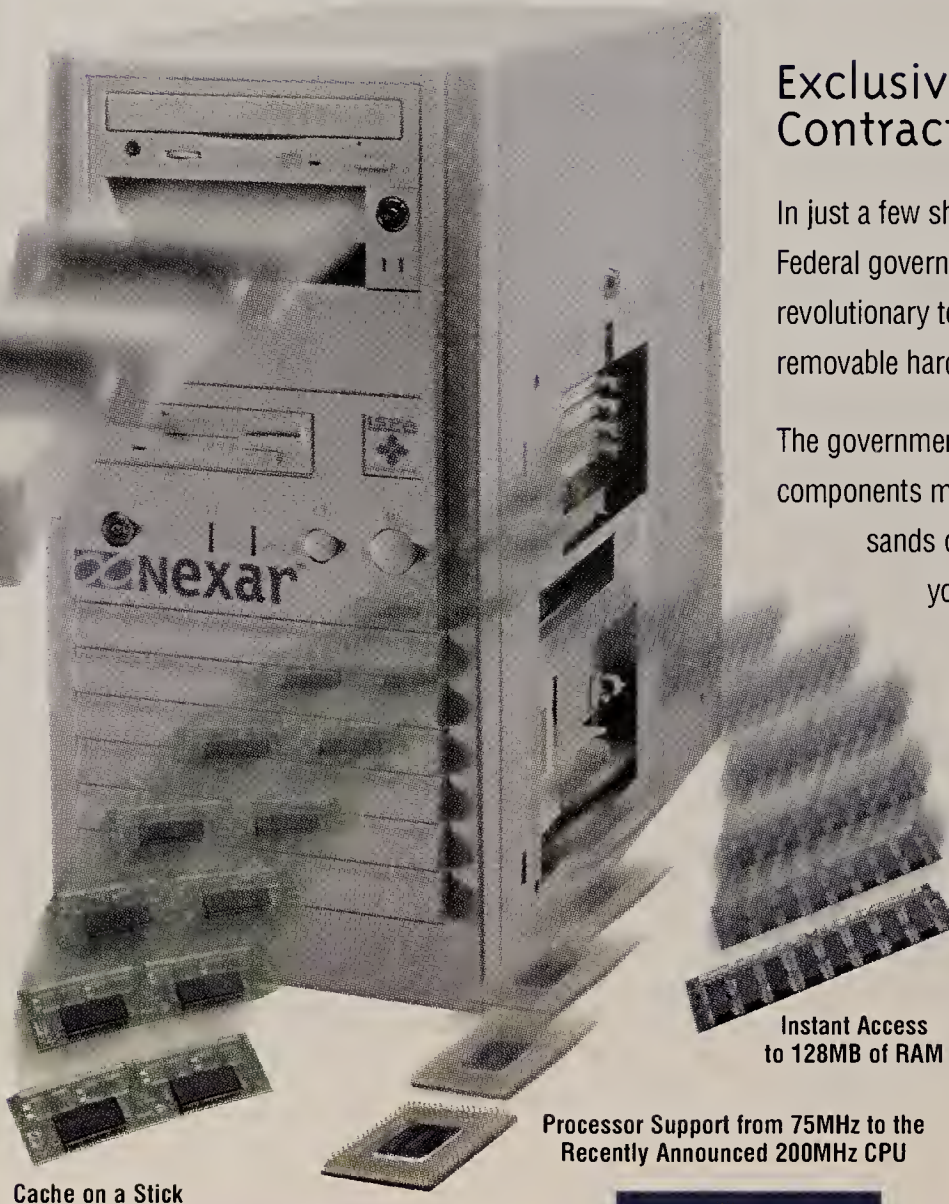
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— Government Computer News, July 29, 1996



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Technology Update

Keeping Up with Network Technologies and Standards

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Ron Nutter, a Master Certified Novell Engineer and Groupware CNE in the Lexington, Ky., area, tracks down the answers to your questions. Call (800) 622-1108, Ext. 476, or send your questions to rnutter@world.std.com.

I'm installing a LAN in a law firm and have run into a frustrating problem: About one-third of the computers freeze during operation.

I have various PC models, some with 8M bytes and others with 16M bytes of RAM. I can't detect any pattern — It happens to old and new machines, at different times of the day and while different programs are running. The only similarities are that all the PCs run Microsoft Corp. Windows 95 and are connected to a peer-to-peer network.

The firm is located in a train station that is 100-plus years old, so I suspect my problem is related to fluctuating power. I've tried using American Power Conversion Corp.'s (APC) Back-UPS 280, but it doesn't seem to help.

I need to figure out why the PCs keep freezing before I install NT Server. Do you have any suggestions? Via the Internet

First, you should hire an electrical engineer who also is a licensed electrician. Have the person examine your physical plant thoroughly.

You also should try APC's Smart UPS, which has a much better built-in filtering system than Back-UPS 280. Also try the company's surge protectors at all workstations and printers on the network. Depending on the severity of the problem, you may need to consider 10Base-T surge protectors, as well.

Have the engineer figure out if the locations at which you have PCs are fed from the same power distribution panel or transformer. If they are not, you should consider installing fiber-optic cable to the hub that handles the PCs in other distribution zones. This could help reduce the problem if it's related to a floating ground or ground potential difference.

Once you have addressed the power problem, make sure you have Windows 95 Service Pack 1 loaded on all the workstations and the latest drivers installed for your network cards.

NFS: A decade old but ready for the Web

Performance improvements and adaptation to TCP/IP make the protocol ready for use on the Internet and intranets.

By Rajiv Khemani

Sometimes even the most familiar protocols get a boost. Such is the case for Network File System (NFS), the de facto standard for sharing files in a heterogeneous environment.

NFS dates to 1984, when Sun Microsystems, Inc. introduced the protocol. It has been defined in two IETF RFCs and two X/Open Company, Ltd. specifications. In addition, Sun has licensed NFS to more than 300 organizations, including Hewlett-Packard Co., IBM and, just last month, Novell, Inc.

NFS has become popular over the years because it allows user files and applications to reside on the network, not on the local machine. This simplifies administration, saves disk space and promotes collaboration.

NFS has kept pace with the sea of changes that have occurred in computer networking during the past decade. Performance has been improved, dedicated NFS file servers have been created that offer out-of-the-box solutions, and the specification has been adapted for the Web. These changes help ensure the protocol's longevity.

Market research firm Dataquest, Inc. estimates that the NFS market is growing at more than 25% annually. According to Dataquest, the protocol is poised to play a crucial role in Internet and intranet applications.

Version 3

NFS Version 3, which has been available for about a year, has a number of improvements over its predecessor. Because it has 64-bit addressing, for example, the latest version can support multigigabyte files on NFS servers. Theoretically, maximum file size is several thousand terabytes. NFS Version 2's maximum file size is 2G bytes.

Due to the intelligent way NFS Version 3 writes to disk on the server, performance is faster. With NFS Version 2, every write request to a file that comes from a client is written to disk prior to acknowledgment. Through a

technique called safe asynchronous writes, NFS Version 3 eliminates the need for a client to wait for individual write requests.

In addition, NFS Version 3 does not place a limit on maximum transfer size, so the protocol can construct and send large chunks of data over the network at one time. An increased buffer size lets NFS efficiently use high-

vice. (For the survey, Sun polled 100 of its own customers and 100 non-Sun users.)

Dedicated NFS servers offer several advantages over general-purpose machines. Because they come preconfigured as NFS file servers, for example, they can be up and running in 30 minutes. They also provide better performance because vendors can opti-

mize them strictly for file access over the Web.

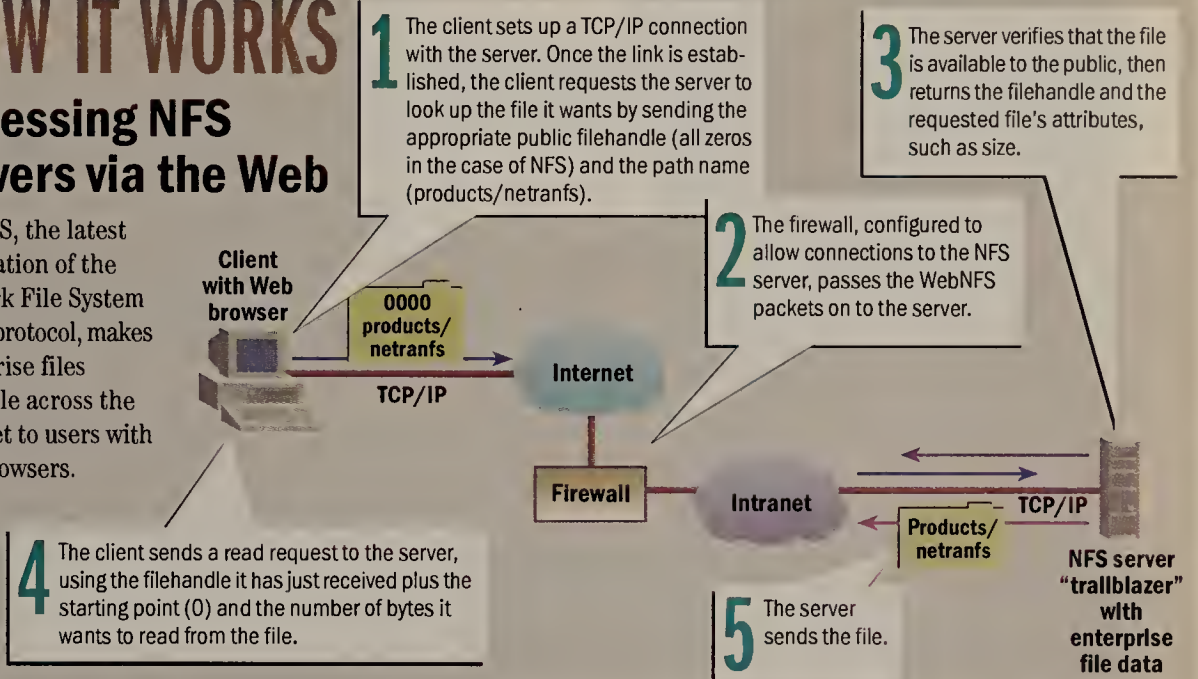
WebNFS also lets a user share and edit files inside a browser, which is fast becoming the universal graphical interface.

Currently, several vendors are evaluating WebNFS for inclusion in their browsers or servers, and Sun's Netra NFS server and ONC+ products already include the software. In addition, IBM,

HOW IT WORKS

Accessing NFS servers via the Web

WebNFS, the latest incarnation of the Network File System (NFS) protocol, makes enterprise files available across the Internet to users with Web browsers.



bandwidth network technologies, such as FDDI and 100M bit/sec Ethernet, which substantially increase its performance.

As another plus, NFS Version 3 uses TCP as the default transport protocol in most implementations. This differs from the earlier version, which relies on the User Datagram Protocol. Because TCP/IP is the underlying protocol for the Internet, installations can now use NFS and HTTP — the lingua franca of the Internet — with the same plumbing underneath.

Dedicated servers

NFS is becoming the basis for a new class of dedicated servers. The demand for such devices is substantial. In a recent survey of 200 corporate users, Sun found that 94% of the respondents already are dedicating general-purpose servers solely for file ser-

mize them strictly for file sharing. In many cases, file access is faster over the network than from the local disk.

A dedicated NFS environment also is more robust than a general-purpose server. A number of vendors, for example, use RAID 5 technology to keep their servers running even when a disk fails.

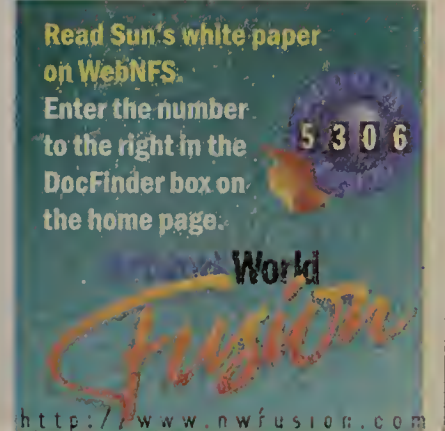
NFS and the Web

NFS has been adopted to the Web through a new technology called WebNFS, which, like NFS, has been widely licensed. WebNFS opens the Internet to NFS file servers, making file information available over the firewall and through proxies to Web browsers and Java applets. Because NFS servers are three to five times more efficient in handling file accesses relative to File Transfer Protocol or HTTP servers, WebNFS is a logical choice

Oracle Corp. and Sun have made NFS a part of their network computer specification.

With its origins at the dawn of local-area networking, NFS is now poised to become a first-class protocol for the Internet and corporate intranets.

Khemani is senior product manager at Sun Microsystems Computer Corp. in Mountain View, Calif.



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Indulge me a warm moment

A few weeks back, during an off-site strategy meeting, one of the industry's best known consultants counseled us on key trends to watch in the coming months.

Beyond identifying particular technologies that will be important, the speaker's main message was this: As reporters and editors, we have to be more skeptical. We need to go beyond the overblown rhetoric from vendors and pundits, and get at the real issues driving corporate networks.

Sound advice. In fact, that kind of skepticism and insight is the value we provide to readers. Becoming even more skeptical — particularly amid all the Internet hype — is a worthy goal.

The downside is that we have to approach developments in the world's most exciting industry with a wariness that gets, well...wearying. Playing the doubting Thomas wears on one over time.

So it was with a jaundiced eye that I agreed to participate in the National Information Infrastructure Awards program this year and attend the NII event last week in New York City. I'm leery of awards, since they usually are aimed more at promoting the presenter than the recipient.

Chalk this one up as a pleasant surprise. In fact, the people profiled during the NII event told pretty moving stories about how networking had enabled them to reach out to inner-city kids, kids in need of adop-

tion, cancer patients or the elderly, for example (see www.gii-awards.com).

Take the winner of the NII Next Generation Award: Starbright World (www.starbright.org). It's amazing. Founder Peter Samuelson and volunteers from the health care, entertainment and computer fields have built a wide-area ATM net that supports a multiuser, three-dimensional playground in which seriously ill children in hospitals across the country can play games, talk over video linkups and do lots of other creative things. The idea is to relieve the loneliness and make being in the hospital easier to deal with for a scared kid.

Samuelson and the other participants talked about networking as a way to help people and bring them together. No spin control, no media strategies. You could drop your guard around them and bask in their enthusiasm. What a refreshing change from all the talk about market share and leveraging installed bases and upsides and downsides.

The event was a wake-up call. Sometimes we get so caught up in browser wars and object standards and IP switching, we forget just the vast human potential of networking. It takes people such as Samuelson and the other NII winners to remind us.

Congratulations to them.

John Gallant, editor in chief

jgallant@nww.com

Collaborative Computing • Steve Lichtman

From groupware to groupweb

There is little doubt that Internet/Web protocols are becoming industry standards for groupware technologies. Just look at what Lotus Development Corp. and Microsoft Corp. have recently done to commercialize their proprietary groupware products.

Lotus recently completed integrating its Domino I Web server into Notes 4.5, which now provides any Web browser with direct access to Notes databases. In addition, Lotus announced its next release, Notes 5.0/Domino II, will be built entirely on Internet standards and protocols. Microsoft is also building Internet messaging standards, such as Network News Transfer Protocol, into the next release of Exchange Server. And Netscape Communications Corp. has finally announced intranet groupware additions to its new Communicator client and SuiteSpot server bundle.

Does all this mean the dawn of a new era of open groupware, or "groupweb," computing?

If you define "open" as interoperability between products, then the answer depends on a product's conformance to standards. Stating a product is based on standards does not necessarily mean it conforms to standards, especially when the formal standards represent the lowest common denominator of interoperability.

Groupware vendors routinely add proprietary extensions to standards-based products to gain a competitive advantage in new features or functionality. It's also common for vendors to develop and release a product based on a proposed standard, anticipating the standard will become formally adopted or their product will garner enough market share to become a de facto standard. HTML 3.2 — supported by today's popular Web browsers — is still in the proposed recommendation phase of the World Wide Web Consortium's standardization process.

If you define open as the ability to substitute one vendor's product for another's, the answer depends on ease of system portability. On the data side, HTML represents the best shot at a universal data format for groupware, but whether a given vendor's intranet groupware client will work with any other vendor's intranet groupware server remains to be seen.

On the application side, we can only hope that a standard language for intranet applications will emerge, such as a truly standard Java. Portability has been the Holy Grail of computing for decades, so don't expect multivendor groupware technologies to solve the prob-

lem anytime soon.

Given that your product decisions will still be limited by each vendor's technological parameters, what course of action should you take? It boils down to knowing what you need and what is available to meet your needs.

At a bare minimum, ask yourself the following questions:

- Is your organization's culture conducive to collaborative computing, or will groupware just be a solution in search of a problem?
 - What specific type of collaborative applications are envisioned?
 - Given the application's scope, what development, operational and economic issues must be resolved?
 - Which groupware features will be essential, nice to have or unimportant for your environment and applications?
 - What are the capabilities and limitations of the groupware products you're considering?
- Besides your own hands-on product evaluations, are independent reviews available from the trade press, industry analysts, systems integrators and end-user organizations?

Many factors must be considered when making a groupware technology decision.

It is hoped that your groupware decision soon will be made easier with groupware technologies that conform to industry standards and are interoperable and even portable. But we are not there yet.

Lichtman is a senior principal at Fairfax, Va.-based American Management Systems and director of the Collaborative Work Environments Laboratory at the AMS Center for Advanced Technologies. He can be reached at (703) 267-3389 or via the Internet at steve_lichtman@amsinc.com.

MESSAGE QUEUE

Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, 161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.

NCs: Hype vs. reality

Regarding your article "Customers take sides in coming 'Net device battle'" (Nov. 4, page 1):

One thing that seems to have been overlooked in the debate about the network computer (NC) is the ability of some clients to run Windows applications. The newly released IBM Network Station is a good example. The Network Station can connect to a Windows NT server using Citrix Systems, Inc.'s client for its WinFrame product (among other options). So the argument that thin clients or NCs can't run Windows applications is, in fact, false.

I am looking to replace 80% of the

Banyan's long-range forecast: Cloudy



Banyan Systems, Inc. continues to ride its downward spiral. Last month, Banyan announced the resignation of company cofounder David Mahoney as chairman, president and chief executive officer. In addition, the company scaled back its workforce by 15% after nine months of declining revenue. This latest shake-up comes only a year after a major restructuring and the layoff of about 10% of Banyan's workforce.

Times are dire at Banyan. According to Gartner Group, Inc., Banyan is having difficulty obtaining new accounts and preventing its installed base from defecting, largely due to the uncertainty surrounding the company and its products. Indeed, in his recent "NOS report card" (NW, Sept. 30, page 40), my colleague, Ram Tackett, noted, "Of the four major NOSes, VINES is the one that prompts the most questions about long-term viability."

VINES isn't the only product that Banyan customers are wondering about. During the past two years, Banyan has defined and redefined its product strategies, causing considerable confusion among customers. And with the latest shake-up, another redefinition is in order.

About a year and a half ago, Banyan outlined an ambitious vision of network computing centered around major components of its Enterprise Network Services. ENS consists of StreetTalk, an enterprise-level directory services product; Intelligent Messaging, a message transport engine; Distributed Enterprise Management Architecture, an SNMP-based network management suite; and security and system administration tools.

Ironically, this attempt at putting a stake in the ground for long-term survival in the networking arena may have accelerated Banyan's undoing. Many of Banyan's major customers saw this vision as a de-emphasis on VINES. They concluded, however wrongly, that Banyan was not fully committed to the long-term viability of VINES as a network operating system. Many enterprise customers took the opportunity to jump ship from VINES, landing in the clutches of Microsoft Corp.'s Windows NT Server or Novell, Inc.'s NetWare 4.X.

The resulting decrease in sales left Banyan with an estimated 5% market share in the NOS arena. What's more, market forces keep chipping away at that paltry number.

Gartner Group, which commands the attention of chief information officers in more than a few organizations, has advised its customers to begin planning their migration strategy from not only VINES, but StreetTalk and Intelligent Messaging,

as well. The sooner the better, it would seem, as Gartner Group believes the investment in VINES as a NOS is viable only through 1997.

Organizations using Banyan's VINES as the NOS platform for StreetTalk and Intelligent Messaging are closely observing Banyan's commitment to port these applications to the Windows NT Server platform. There seems to be considerable interest in keeping StreetTalk, just not on the VINES platform.

Banyan might find it wise to concede the NOS market to its competitors and to focus all of its energy on killer enterprise directory services, which have always been Banyan's strength. Indeed, Mahoney's open letter to customers hints that Banyan will make the transition from a NOS vendor to more of a network services vendor. (For the complete text of Mahoney's letter, check out <http://www.banyan.com/letter-to-customers.html>.)

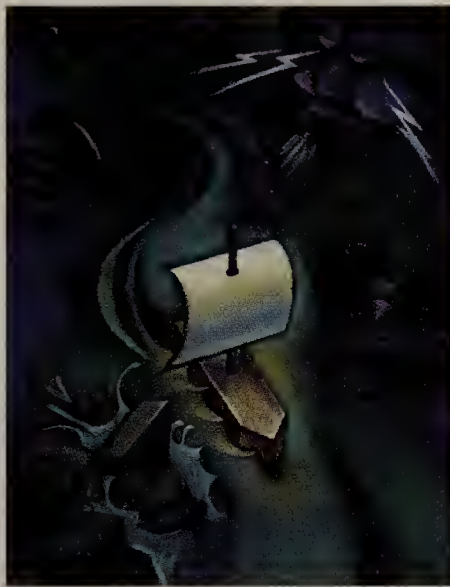
In this area, there's hope for Banyan yet—given Windows NT Server's glaring lack of a good directory service and Banyan's decision to port StreetTalk to the Windows NT platform. As long as Microsoft continues to offer little in the way of its own solution to directory services, Banyan has an opportunity to entrench itself in some fairly good-size enterprise accounts with tens of thousands of users.

But this window of opportunity won't last long. Microsoft had intended to release its own enterprise directory services by now, but its recent focus on the Internet delayed those plans. And, of course, Novell wants a bit of the NT market, too, for its NetWare Directory Services.

If Banyan products figure in your current or future network plans, you'd do well to heed Gartner Group's advice. Consider an NT Server integration/migration strategy. VINES is a niche player in the NOS market. StreetTalk has more viability, but only on the NT platform. And even that can be undermined as Internet standards such as Lightweight Directory Access Protocol challenge the status quo of the directory services market.

I don't like to kick 'em when they're down, but in this case, Banyan seems to be down for the count in the NOS market. My advice is to place your money on another player.

Musthaler is vice president of research at Currid & Co., a Houston-based information technology consulting firm. She can be reached at (713) 789-5995 or via the Internet at linda@currid.com.



computers in my PC environment with NCs. I plan on rolling them out to 100 clients this year. If it works, I will save \$150,000 per year just in capital costs. That represents 30% of my capital budget.

*Karl Reischl
Senior systems analyst
Oshkosh Truck Corp.
Oshkosh, Wis.*

Your article "Network computers scorecard: hype 1, reality 0" (Nov. 18, page 1) underestimates the potential popularity of network computers (NC). You say, "until vendors work out the kinks in NCs, we'll stick with more traditional technology," but that could change with exceptional marketing.

If Microsoft Corp. can fool the computing public into believing Windows 95 is the ultimate operating system when it's actually garbage, then slick marketing can do the same for NCs.

If anything deserves the headline "Hype 1, reality 0," it's Windows 95. Until Microsoft works out the kinks in Windows 95, I'll stick with *functional* technology like Unix or OS/2.

*John Berger
Harrisburg, Pa.*

ATM's no desktop panacea

Your editorial "Keep an eye on Ungermann and First Virtual" (Nov. 11, page 40) states: "ATM, in general, is being beaten about the head these days by shortsighted critics who think that technologies such as Gigabit Ethernet have rendered it all but obsolete." Well, those critics may be biased, but they may just have a technical point or two.

There are valid technical reasons why people are less than enamored of ATM to the desktop. ATM forces every possible destination on the LAN to have its own virtual circuit.

In the days when one's PC

connected only to the local file server, this wouldn't have been an issue. On the other hand, today we have multiple file servers, Web servers, mail servers, routers and so forth. Each possible set of logical connections requires its own virtual circuit in the ATM switch. Either you pay the price in administrative complexity to set up all those possible connections in advance, or you pay the price in poor performance to set up those connections on the fly. Either way, you pay a price with ATM.

In addition, ATM lacks a critical feature that will enable the new crop of applications on the horizon: multicasting. Without a broadcast or multicast feature, you end up with a plethora of separate logical connections in your ATM switch carrying the exact same data.

So let's keep ATM in perspective. ATM will not replace Ethernet, gigabit or otherwise,

where Ethernet is the appropriate technology — just as Ethernet will not replace ATM where ATM is the appropriate technology. ATM is a tool like any other tool in that it must be

used correctly.

*Brian Lloyd
Manager of business software development
Livingston Enterprises, Inc.
Cameron Park, Calif.*

Teletoons



*By Phil Frank and Joe Trolise
baba@sgate.com*

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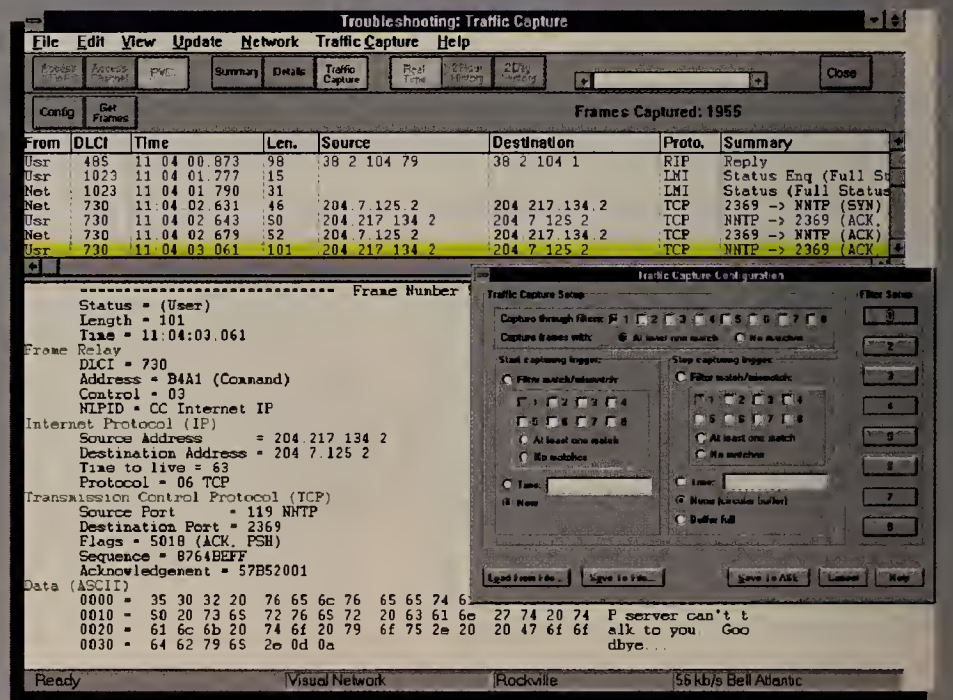
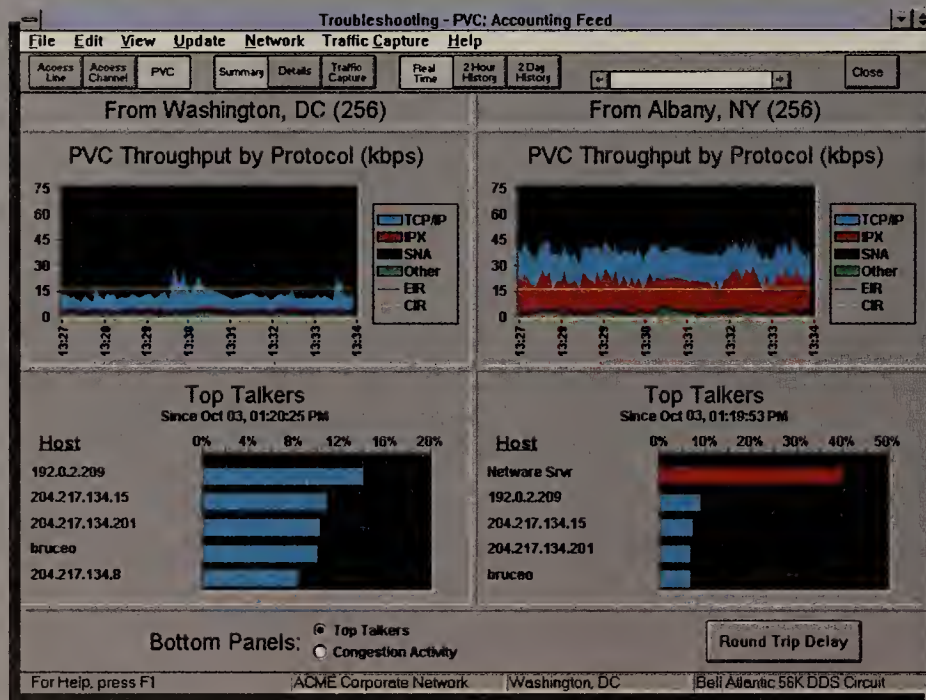
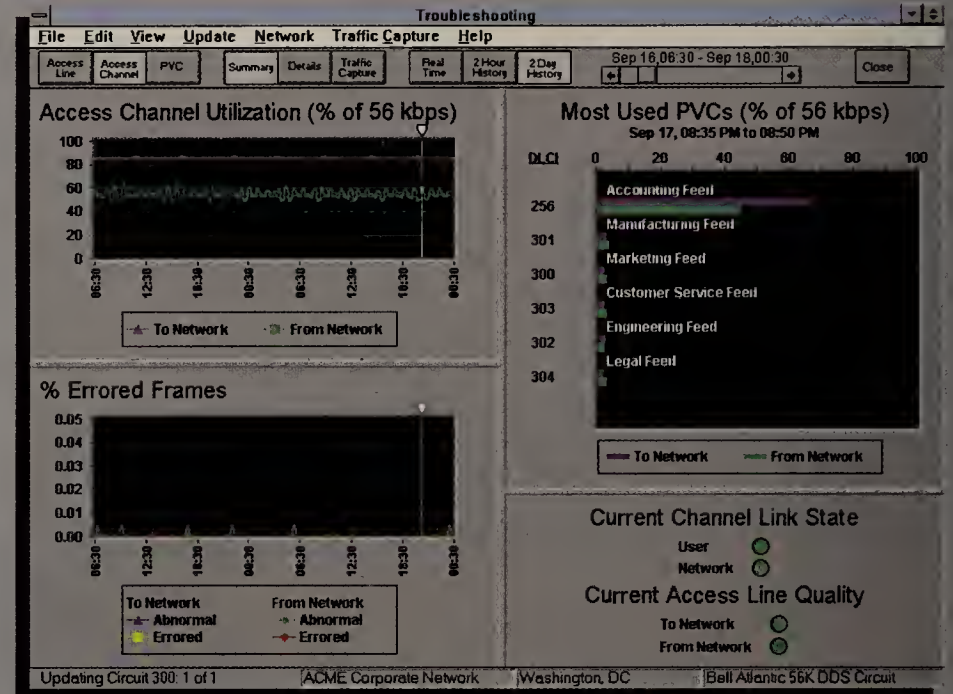
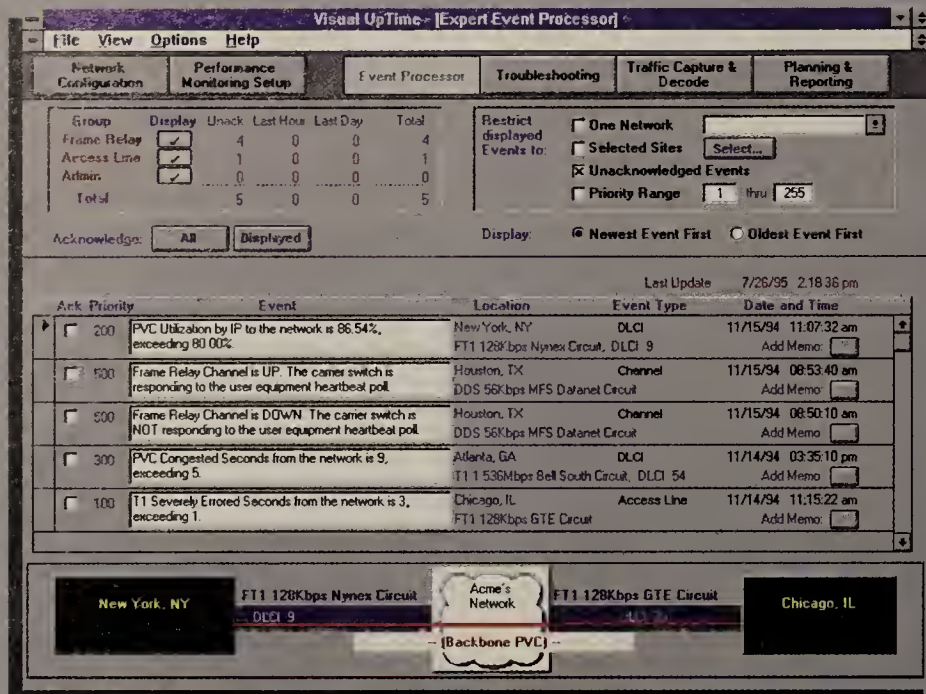
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By Ram Tackett

Webified database servers

Vendors are scrambling to put a new Web face on their DBMS wares.

Linking relational database management systems to the World-Wide Web — once considered a near-miraculous feat — is about to become a more palatable chore, albeit not quite child's play.

A number of leading DBMS server vendors are rushing to wrap a Web-like facade around their products by implementing middleware that enables Web servers to interact with DBMS servers far better than they can today. This has benefits for users in two camps.

In one camp are Webmasters who may find themselves attracted by the lure of using a DBMS as a repository for Web site content. A "Webified" DBMS means you can toss out static Web pages and start creating them dynamically by tapping the middleware to extract data from various database records.

In the other camp are corporate IS staff who get the option of jettisoning worrisome and expensive client/server computing models in favor of more simple and cost-effective Web technology deployed across an intranet.

The big plus for using Web technology to run database applications is you don't have to be as concerned about writing and maintaining a series of client-based applications to act as front ends. These applications handle a

series of tasks, from presenting preformatted screens to generating SQL queries. Every time improvements are made to the front end, you have to distribute upgrades to all the client machines.

Using Web technology, you create HTML pages that give users the screens they need, and let browsers kick off application processing tasks on Web servers that, in turn,

access the DBMS. This means any time you change a screen, you modify an HTML page instead of shipping out new versions of the front end. Likewise, you can centrally modify Web server-based scripts for accessing the DBMS without making changes on the browser end.

As a bonus, using Web technology to front-end a DBMS gives you the option of deploying network computers, also known as thin clients, to run the browser and net software needed to communicate with Web servers.

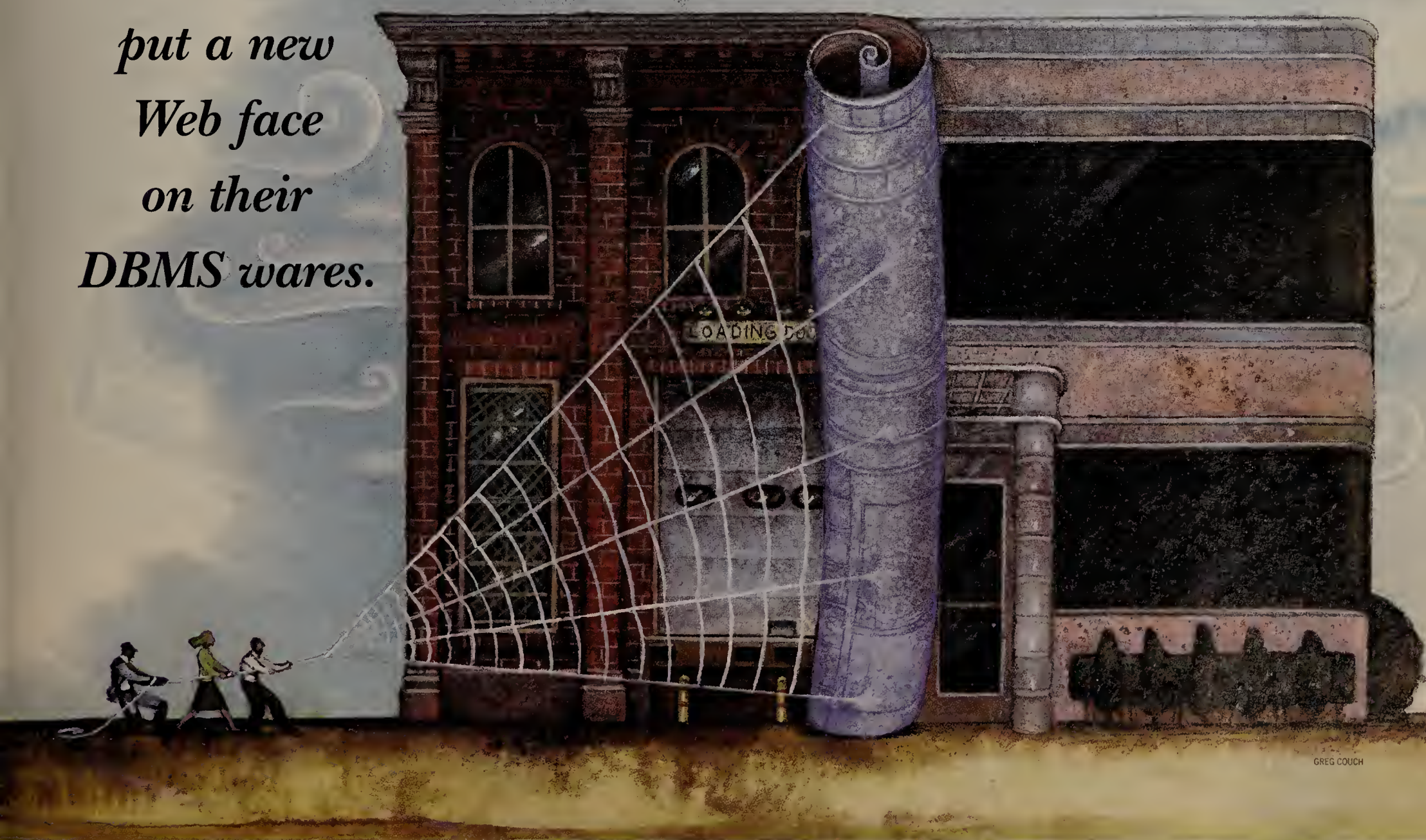
To be clear, vendors continue to make incremental improvements to their products (see story, page 50), but they pale in comparison to the effort behind bringing Web technology to DBMS servers.

Each of the big relational DBMS server vendors — IBM, Informix, Inc., Microsoft Corp., Oracle Corp. and Sybase, Inc. — has announced middleware that can move

JAVA, ACTIVEX SUPPORT IS LIMITED

Only a handful of relational DBMS server vendors provide tools for creating Java applets or ActiveX controls.

- Borland, IBM, Informix, Microsoft and Raima support development of client-side Java applets.
- IBM, Informix, Microsoft and UniSQL support development of server-side Java applets.
- IBM, Informix, Microsoft, Sybase and Unidata support the JavaScript language.
- Informix and Microsoft support development of client-side ActiveX controls.
- Informix, Sybase and Microsoft support development of server-side ActiveX controls.





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Company	Product	Operating systems	Distributed database features	Data access APIs	Network protocols supported	Internet features	Mgmt. features	Price/Number of users
			Queries Updates Two-phase commit Point-in-time snapshot replication Continuous transaction-level replication Read-only replication Read/write replication Data changes captured by log Data changes captured by trigger	ODBC base level ODBC level 1 ODBC level 2 Proprietary SAG X/Open CLI		Dynamic HTML creation CGI application development NSAPI support ISAPI support Web server integration	GUI-based performance monitor GUI-based administration Single workstation manages distributed servers SNMP agent	
Borland International, Inc. (800) 453-3375 http://www.borland.com.	InterBase 4.X	NetWare; VMS; Windows 3.X, NT, 95; Unix	• • •	• • • •	DECnet, IPX, NETBEUI, TCP/IP		• •	\$250/1-\$12,650/100 (1)
Centura Software Corp. (800) 444-8782 http://www.centurasoft.com	SQLBase 6.1.1	NetWare; Windows 3.X, NT, 95	•	• •	IPX, NETBEUI, NETBIOS, TCP/IP		• • • v1	\$295/1-\$9,995/800
Cincom Systems, Inc. (800) 543-3010 http://www.cincom.com	Supra Server 2.7	NetWare; OS/2; VMS; Windows 3.X, NT; Unix	• • •	• •	DECnet, IPX, NETBEUI, SNA/LU 6.2, TCP/IP, VINES, other		•	\$1,500/1
	Total FrameWork	Windows 3.X, NT; Unix	• • • •	• • •	TCP/IP	•	•	\$5,200/1
Computer Associates International, Inc. (516) 342-5224 http://www.cai.com	CA-OpenIngres Version 1.2	NetWare; VMS; Windows 3.X, NT; Unix; other	• • • • • • • •		AppleTalk, DECnet, IPX, NETBEUI, NETBIOS, SNA/LU 6.2, TCP/IP, VINES, other	• •	• • •	\$1,000/1-\$50,000/Unlimited
Empress Software, Inc. (301) 220-1919 http://www.empress.com	Empress RDBMS 6.8	Windows 3.X, NT; Unix	• • • •	• •	TCP/IP	•	•	\$800/2-\$25,000/Unlimited-\$13,700/129+-\$259,000/Unlimited
Hewlett-Packard Co. (800) 637-7740 http://www.hp.com	AIIBase SQL	HP MPE/ix; Unix	• • • •	• •	TCP/IP			\$4,000/8-\$120,000/Unlimited
IBM (800) 426-2255 http://www.software.ibm.com/data	DB2 Version 2	OS/2; Windows 3.X, NT; Unix; other	• • • • • • •	• • • •	IPX, NETBIOS, SNA/LU 6.2, TCP/IP	• • •	• • • v1	\$1,000/1-\$7,500/101
Informix Software, Inc. (800) 331-1763 http://www.informix.com	OnLine Dynamic Server 7.0	Windows NT; Unix	• • • • • • • •	• •	IPX, TCP/IP	• • • • •	• • v1	(2)
Micro Data Base Systems, Inc. (800) 445-6327 http://www.mdb.com	Titanium 6.1	NetWare; OS/2; Windows 3.X, NT, 95; Unix; other		•	IPX, NETBEUI, NETBIOS, TCP/IP		•	(2)
Microsoft Corp. (800) 426-9400 http://www.microsoft.com/sql	SQL Server 6.5	Windows NT	• • • • • • • •	• • • •	AppleTalk, DECnet, IPX, NETBEUI, NETBIOS, SNA/LU 6.2, TCP/IP, VINES, other	• • • •	• • • v1, v2	\$1,399/5-\$24,999/Unlimited
Oracle Corp. (800) 542-1170 http://www.oracle.com	Oracle Server 7.3	NetWare; OS/2; Windows 3.X, NT; VMS; Unix; other	• • • • • • • •	• • • •	AppleTalk, DECnet, IPX, NETBEUI, NETBIOS, TCP/IP, VINES	• • • •	• • • v1	(2)
Pervasive Software (800) 287-4383 http://www.pervasive-sw.com	Scalable SQL 4.0	NetWare; Windows 3.X, NT	• • • •	• • • •	IPX, TCP/IP	•		\$995/10-\$9,995/Unlimited

Products highlighted in color were selected for the Short List.

Footnotes: (1) Suggested retail price is for Window NT. Discounts are available. (2) Vendor would not supply information. (3) Prices are based on the number of processors in the NonStop and cover 2-16 processors. Per user pricing will be published early in 1997.
CGI = Common Gateway Interface CLI = Call Level Interface GUI = Graphical User Interface ISAPI = Internet Server API NSAPI = Netscape Server API SAG = SQL Access Group

Chart compiled by Jim Brown

data into and out of DBMSs using Web technology.

Background issues

Before you march off to examine the products, you'll need to brush up on a few issues that could affect how you decide to mix Web and DBMS technologies.

For instance, you have to worry more about how you recover session information in a Web environment, according to Jossi Gil, president of Four Seasons Software of Edison, N.J.

Session information tracks where users have been in the database so, if a connection is lost, they can return to previously accessed pages or records when the link comes back.

The stateless nature of the Web poses a problem on this front because if you lose a connection, you often lose track of where you were in the database. To solve this

problem, future DBMS and Web server wares will support what's called a "state server engine" that keeps track of sessions and stores the data for future retrieval. This way users will be able to return to where they were prior to a failure.

You also need to keep performance expectations in check as you move from client/server to Web processing. It will take longer to create dynamic Web pages via a Web server-to-DBMS connection than it will to access a static HTML file directly from a file system.

Some DBMS servers are more adept than others at streamlining this process. The most time-consuming portion of processing Web-generated database queries is when the Web server-to-DBMS connection is opened and closed. Some products, such as Oracle's WebServer, can be configured to open a database connection when the server or application is

started and keep it open.

To dodge other performance problems, move away from using Common Gateway Interface (CGI) scripts, which are so popular today. Each CGI call generates a separate process, which grabs memory and other resources from the processor running the Web server. This creates a fair amount of overhead and can drag down performance.

A better way to connect a Web server to a DBMS server is through an API such as Netscape Communications Corp.'s Netscape Server API or Microsoft's Internet Server API, which do not require separate memory or other resources.

A number of major DBMS vendors offer variations on this theme, such as the use of middleware components that can forge an even tighter and more functional Web server-to-DBMS link. Here is a look at what the five leading DBMS server

vendors are doing on this front.

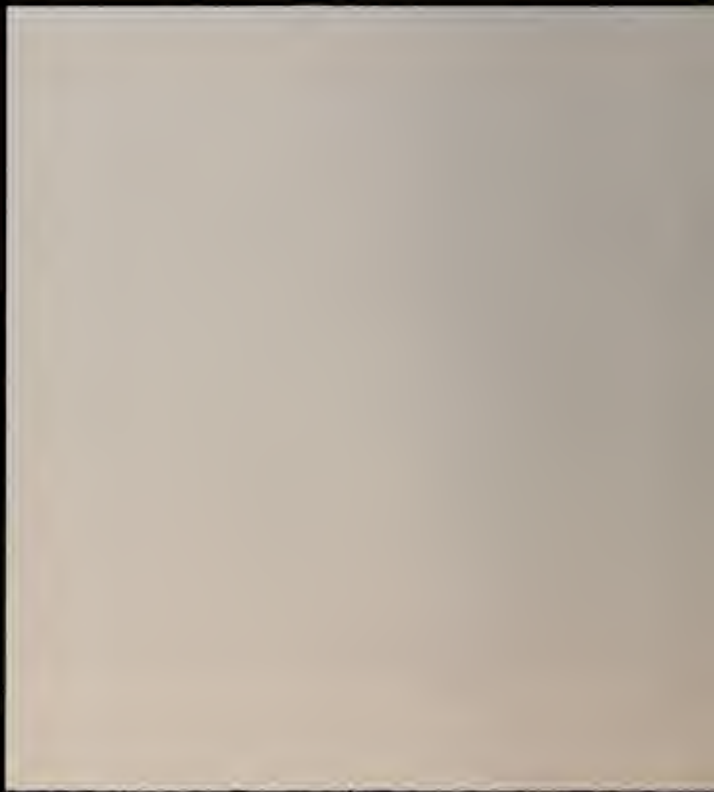
What Oracle has

Oracle offers Web Request Broker (WRB) software to create a link between its WebServer product and its DBMS. WRB is part of WebServer, and Oracle is shipping both products with every copy of Oracle7 Server 7.3. Users with prior versions of Oracle7 can buy WebServer and WRB as an add-on.

This family of Web-to-DBMS integration products supports online transaction processing and allows persistent sessions among Web browsers, Web servers and database servers. A persistent session retains the state of the database interaction between browser screens.

WRB bypasses CGI links by forging a direct Web server-to-DBMS connection. By getting CGI out of the picture, WRB exerts more control over the processes





RELATIONAL DBMS SERVER SOFTWARE

Company	Product	Operating systems	Distributed database features								Data access APIs					Network protocols supported	Internet features					Mgmt. features				Price/Number of users	
			Queries	Updates	Two-phase commit	Point-in-time snapshot replication	Continuous transaction-level replication	Read-only replication	Read/write replication	Data changes captured by log	Data changes captured by trigger	ODBC base level	ODBC level 1	ODBC level 2	Proprietary	SAG X/Open CLI		Dynamic HTML creation	CGI application development	NSAPI support	ISAPI support	Web server integration	GUI-based performance monitor	GUI-based administration	Single workstation manages distributed servers	SNMP agent	
Polyhedra PLC 011-44-1908-366844 http://www.polyhedra.com	Polyhedra 2.0	Windows NT; Unix; other			•	•				•		•					TCP/IP, other							•			\$4,340/1-\$6,260/50
Progress Software Corp. (800) 477-6473 http://www.progress.com	Progress 8.1	HP MPE/ix; NetWare; VMS; Windows 3.X, NT; Unix			•	•	•	•	•	•	•	•	•	•			IPX, NETBEUI, NETBIOS, SNA/LU 6.2, TCP/IP, other	•	•								\$250/1-\$310,000/2,000
Quadbase Systems Inc. (408) 982-0835 http://www.quadbase.com	Quadbase-SQL Server 4.0c	NetWare; Windows 3.X, NT								•		•	•	•	•		IPX, TCP/IP, other						•				\$995/5-\$5,995/Unlimited
Raima Corp. (206) 557-0200 http://www.raima.com	Velocis Database Server 2.0	NetWare; OS/2; Windows 3.X, NT; Unix; other								•	•	•	•				IPX, NETBIOS, TCP/IP		•	•	•		•	•			\$595/1-\$8,995+/Unlimited
Red Brick Systems, Inc. (408) 399-3200 http://www.redbrick.com	Red Brick Warehouse 5.0	Windows NT; Unix										•	•				TCP/IP										\$25,000-\$50,000/10-\$506,000-\$625,000/Unlimited
Software AG (800) 423-2227 http://www.sagus.com	Adabas D 6.1.1.2	OS/2; Windows NT; Unix	•	•	•	•	•	•		•	•			•			TCP/IP	•	•	•	•	•					\$2,650/1-\$17,500/100
Sybase, Inc. (800) 879-2273 http://www.sybase.com	SQL Anywhere	NetWare; OS/2; Windows 3.X, NT, 95			•		•	•	•	•	•	•	•	•			IPX, NETBEUI, NETBIOS, TCP/IP	•	•	•	•	•	•	•	•		\$299/1-\$4,995/Unlimited
	SQL Server	NetWare; Windows NT, 95			•	•	•	•	•	•	•	•	•	•			IPX, NETBEUI, NETBIOS, TCP/IP					•	•	•	•		\$995/1-\$34,995/Unlimited
Tandem Computers, Inc. (408) 285-6000 http://www.tandem.com	NonStop SQL/MP 3.0	Himalaya NonStop Kernel	•	•	•			•		•		•	•	•	•	•	SNA/LU 6.2, TCP/IP, other						•	•	•		\$24,000/Unlimited-\$239,000/Unlimted (3)
Unidata, inc. (303) 294-0800 http://www.unidata.com	UniData 4.0	Windows 3.X, NT; Unix; other								•				•	•		DECnet, IPX/SPX, TCP/IP, VINES	•	•								\$315/1-\$610/1
UniSQL, Inc. (800) 451-3267 http://www.unisql.com	UniSQL 3.5.2	Windows 3.X, NT; Unix			•					•		•				•	TCP/IP	•	•	•	•	•					\$10,000/4-\$90,000/Unlimited
Vmark Software, Inc. (800) 966-9875 http://www.vmark.com	UniVerse RDBMS 9.3.1	Windows NT; Unix															NETBEUI, TCP/IP	•	•		•	•	•	•			\$295/1-\$435/1

Products highlighted in color were selected for the Short List.

Footnotes: (1) Suggested retail price is for Window NT. Discounts are available. (2) Vendor would not supply information. (3) Prices are based on the number of processors in the NonStop and cover 2-16 processors. Per user pricing will be published early in 1997.

CGI = Common Gateway Interface CLI = Call Level Interface GUI = Graphical User Interface ISAPI = Internet Server API NSAPI = Netscape Server API SAG = SQL Access Group

Chart compiled by Jim Brown

generated by a particular application. For instance, it handles the management of multiple simultaneous database connections to ensure higher performance.

Programmers can also take advantage of a WRB API to develop what Oracle calls “cartridges,” which are programming interfaces or packaged applications that can plug into WebServer and use common DBMS functions, such as stored procedures for database access. For example, there’s a cartridge for Java and another for PL/SQL, an Oracle-specific programming language.

Although the primary focus of WRB is to service Oracle7 and WebServer, the company plans to soon support Web servers from Netscape and Microsoft. Support for non-Oracle DBMSs is also in the works.

In addition to WRB, Oracle has new versions of its Developer/2000 and Designer/2000 tools that can be used to

develop intranet applications. Have a look at these tools only if you are an enterprise-level developer because they require a solid understanding of Oracle’s DBMS implementation concepts and involve a steeper learning curve than some competing offerings.

A drawback to Oracle’s Web-to-DBMS solutions is cost. Oracle’s pricing is one of the most complicated when taking into account variables such as Web and non-Web client licenses and multiprocessor configurations. Check the fine print on licensing terms. In some cases, for example, you get a product with an unlimited usage license, and in others you have to pay on a per-client or even a per-Web browser basis.

Microsoft’s answer

If you’ve got an investment in Windows NT, Microsoft’s SQL Server becomes an

attractive choice.

Microsoft is determined to beat its competition by offering enticing functionality and some of the strongest price/performance ratios available when running on Intel Corp. processors. Unlike Oracle, which is focusing on high-end users, Microsoft is targeting a broader market by offering a general-purpose, easy-to-use DBMS that can also serve Internet needs.

Bundled in SQL Server 6.5 is Web Assistant, a tool that eases dynamic HTML page creation. Web Assistant walks you through the process of creating a routine that will pull specific data from the DBMS and use it to create a static HTML page.

Web Assistant provides three choices for retrieving data from the DBMS. It can be instructed to pull columns from a particular database table, use free-form SQL statements or employ stored procedures.

You can define when Web Assistant should get the required data and create the HTML document using criteria such as date, time of day or whenever specific data changes. This scheduling flexibility enables you, for example, to generate a sales report every night that can be stored on an intranet server for retrieval the next morning by executives.

The beauty of this implementation is that Web users accessing those HTML documents won’t tie up the database in real time; they’ll just be accessing a static HTML page, albeit one that’s being dynamically updated.

The drawback to Web Assistant is that it won’t create dynamic Web pages on the fly. For instance, it can’t look up the prior activity record of a person logging on to a Web site and then pass along a personalized greeting, recapping their last visit.

On the Web server front, Microsoft’s

Reader views on relational DBMS server software

Based on 100 interviews, unless otherwise noted

Are you happy with your relational DBMS server?
(Based on 61 users with experience)



Happy enough to keep it



"It has performed very well for us so far. With the latest enhancements, we can output data in an HTML format. That enables us to present data back to the browser easily."

"I'm not a programmer. But the programmers are happy with it, and that means so am I."

"It's doing the job that we expected. Part of our evaluation criteria was whether the new features were enough to warrant converting what we had. If we were going to change, we wanted something that was better, not just as good."

Unhappy enough to seek alternatives



"It didn't meet our expectations. It was not robust enough for our needs."

"Because of problems with performance. Also, the organization standard is moving towards Informix."

"A lack of features, slow problem-solving, and our parent company is dictating change."

What type of interaction with a relational DBMS server do client workstations have via a Web browser?

Now

(Based on 62 users currently enabling data access via Web browsers)

Report generation **66.1%**

Online transaction processing **58.1%**

Passthrough access to legacy data **51.6%**

Internet commerce **27.4%**

Datastreaming of video and audio **14.5%**

In 12 months

(Based on 97 users planning to support data access via Web browsers)

Report generation **83.5%**

Online transaction processing **70.1%**

Passthrough access to legacy data **67%**

Internet commerce **46.4%**

Datastreaming **38.1%**

Other **1%**

How important are the following factors in selecting a relational DBMS server?*

Scalability/capacity **4.54**

Distributed DBMS capabilities **4.21**

Fault tolerance features **4.18**

Ease of programming **4.15**

Availability of third-party client development tools **3.81**

Data warehousing capabilities **3.76**

Internet/intranet capabilities **3.65**

* Highest possible score is 5.

The survey was conducted by Focus Data, an independent market research firm in Framingham, Mass., that gathers primary data concerning enterprise network environments and needs of end users. To purchase full survey results, contact Mona Dabbon at (508) 626-2556, or via E-mail at: mdabbon@focusdata.ultranet.com.

Internet Information Server (IIS), which is bundled in Windows NT Server 4.0, can be used to publish data from any Open Database Connectivity (ODBC)-compliant DBMS, such as SQL Server. In fact, SQL Server makes a compelling companion for IIS because of Microsoft's unlimited license pricing for the SQL Internet Connectors — software tools that pull static pages created using Web Assistant into IIS — when used in an intranet environment. For non-intranet applications, however, you'll still need SQL Server client licenses.

The Informix offerings

While Oracle and Microsoft have their own Web servers, Informix had to team with Netscape. In fact, Netscape bruised some egos at leading DBMS companies this year by bundling Informix's Online Workgroup Server within LiveWire Pro, which is part of the Netscape SuiteSpot offering. Oracle and Sybase have since formed alliances with Netscape.

The bundle of Informix and Netscape products is licensed for unlimited users when deployed in a Web environment, but you can't use the same DBMS for non-Web applications.

Informix gives you several options for plugging relational data into Web pages. At the low end, the company provides a free Web Interface Kit, which can be used to establish simple Web-to-DBMS links using CGI. A more sophisticated option is the Web Connectivity Framework, which lets a Web site maintain session state information the same way a database application does.

Informix also sells Web DataBlade, an application development environment that enables programmers to build

sophisticated Web-based database applications from a series of modules known as DataBlades. The DataBlade technology is the linchpin in Informix's long-term strategy to use object technology in the Web environment, and was acquired when Informix bought Illustra Information Technologies, Inc.

DataBlades are essentially an object module extension to the Illustra database. DataBlades encapsulate all the data access functions and indexing needed for new data types. You can store complex data such as video, voice and images, along with text and other multimedia data types. Web applications will then be able to retrieve that information and mix it to create Web pages on the fly.

Unfortunately, you can only use DataBlades with the Illustra database, not the existing Informix products. That will be fixed in a forthcoming version of Web DataBlade that will be part of Informix's Universal Server, which merges Informix's relational DBMS with Illustra products.

IBM's vision

IBM is also working to support complex data types. In fact, Big Blue recently announced it will be adding complex data management capabilities to copies of DB2 Version 2 for OS/2 and AIX.

In the meantime, IBM's World-Wide Web Connection provides Web connectivity for DB2 Version 2. It is soon to be replaced by Net.Data, an upwardly compatible follow-on version that is in beta.

Net.Data enables developers to transform static HTML Web pages into dynamic Web applications using Web macros. These macros have the simplicity of HTML with the functionality of CGI

Other key DBMS server improvements

In addition to adding support for Web technology, database management system server vendors enhanced their businesses and product lines in other ways. Here is a summary of some of the more important enhancements.

- Sybase, Inc.'s SQL Server 11 for Windows NT gained a new Logical Memory Manager that supports a combination of online transaction processing and real-time decision support. With it, you can create an unlimited number of named caches, which are database buffers in memory assigned to specific tables that speed access to data.
- With SQL Server 6.5, Microsoft Corp. improved integration with those of other DBMSs, enabling you to replicate data to any Open Database Connectivity-compliant database server, such as IBM's DB2, Oracle Corp.'s Oracle7 and Sybase's products.
- Informix Software, Inc. finally wrapped up its merger with Illustra Information Technologies, Inc., which brought Informix some important object-oriented DBMS technology. Informix also made available its MetaCube Product Family, a series of relational online analytical processing products that help you slice and dice data for decision support.
- Windows NT Server is quickly moving up the ranks in the network operating system arena, displacing both Novell, Inc.'s NetWare and IBM's OS/2 Warp Server as low-end DBMS platforms. Several vendors with heavy Unix backgrounds — including Informix — introduced new versions of their products that run under Windows NT ahead of their Unix siblings.

If the trend continues, Windows NT Server could displace Unix as a favored DBMS operating system before the turn of the century. In fact, Windows NT is already making strong inroads in international markets such as Japan, where many of the domestic hardware companies missed the Unix market entirely.

—Ram Tackett

applications. This makes it easy to add live data to static Web pages using information stored in databases, flat files, registries, applications and system services.

Initially, Net.Data will be able to tap into DB2 natively and to non-IBM DBMSs via an ODBC driver. Support for Java, Perl and Rexx scripts will also be included.

IBM is positioning Net.Data as a migration option from client/server- to Web-based applications. To further seed this effort, IBM said it will offer a bundled package of DB2 (for OS/2 or AIX), Net.Data and NetObjects Fusion, a set of Web development tools from NetObjects of Woodside, Calif.

The Sybase slant

Sybase has taken a different approach, opting to work on software that will enable you to create customized Web pages on the fly. Sybase's web.sql, which is currently

in beta, and ObjectConnect multidatabase connectivity software are the glue in Sybase's three-tier application server model, which links Web servers to Sybase and other enterprise databases.

With web.sql, you can insert database instructions such as SQL statements and Perl scripts into the text of HTML pages. This enables you to write Web pages that generate personalized content based on a user's patterns and preferences.

For example, users that have placed an order via the Web, can be supplied a page offering a special discount on the next order.

Sybase also offers NetImpact Dynamo, which provides an interpretive gateway between its SQL Anywhere Professional DBMS and a Web server. A unique aspect of NetImpact Dynamo is that it enables you to outfit mobile workers with their own mini versions of your intranet on their laptops.

Sybase also resells and supports Netscape's Webserver and browser products.

Keep an eye out for objects

With all their middleware, the products out there today should be enough to let you start supporting mid-range and low-end Web-based applications, says Chris Maroney, director of network operations at Extra.net, a systems integrator in New York.

Mid-range applications include transaction processing using a Web browser and data stored in a relational DBMS. On the low end, you can start playing around with Web-based query and report-generation applications.

But an object-oriented DBMS, or a hybrid object and relational database, will be needed to support the type of high-end, multimedia applications everyone envisions for the Web, Maroney says. With such DBMSs, you can store video and audio clips as objects, for example, and enable remote users to access video-based training via a Web browser.

Complex data types and object management for audio and video are still for Type A organizations, according to Kevin Strange, a research director at Gartner Group, Inc. But Strange sees these tech-

There's tons more product comparison information on Network World Fusion. Type the DocFinder number below, and you'll be able to download charts listing the:

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nologies becoming mainstream within corporations by the year 2000.

So don't be surprised if you suddenly find yourself with a combination of relational and object databases by the turn of the century, especially as you move more of your information processing to Internet- or intranet-based solutions.

Tackett is an industry analyst with Currid & Co., a technology assessment firm in Houston. You can reach him via the Internet at tackett@currid.com, or by phone at (713) 789-5995.

NetworkWorld Short List

Relational DBMS servers

The Short List highlights products Network World recommends you examine when shopping for relational DBMS server software. Companies named to this list display strong support for Web technology within their products, and offer a rich set of core DBMS features that can satisfy the needs of enterprise network users. Your needs may differ.

With its recent acquisition of Illustra Information Technologies, Inc., **Informix Software** got the jump on its competition in integrating object technology into a DBMS. While a partnership with Netscape Communications Corp. has strengthened Informix's position in the Internet market, the company already had strong support for traffic-intensive Web-based applications in its **OnLine Dynamic Server 7.0**, offering parallel processing servers with strong parallel query and transaction execution support. That also positions Informix well to support processing-intensive data warehousing applications. DataBlades, which define object modules for encapsulating all the functions and indexing needed to support new data types, will also play a key role in enabling Informix's forthcoming Universal Server product. The offering merges Illustra and Informix products to support Web-based applications.

The growing base of Windows NT support gives **Microsoft's SQL Server 6.5** a boost. With Version 4.0 of NT and Version 6.5 of SQL Server, the family is finally starting to mature to the point where it can begin serving the needs of enterprise users. SQL Server is one of the easiest DBMSs to use. That, plus strong third-party driver and application support, have bolstered Windows NT-based products. Its commodity-based pricing gives customers the price/performance ratio they need on Intel platforms. With upcoming NT clustering technology, future versions of SQL Server will give Unix implementations an even better run for their money.

On the Web publishing front, Microsoft SQL Server eases HTML creation via an integrated Web Assistant. Microsoft has also made strides to improve SQL Server's ability to work with other vendors' DBMSs in a heterogeneous environment.

Oracle is still the king of the DBMS server world with its **Oracle Server 7.3**, contributing greatly to the firm's \$1 billion in annual sales. The company offers the strongest cross-platform and third-party support available. It offers soup-to-nuts solutions for most of your DBMS and intranet needs using a common set of application authoring tools from client/browser to application/database server. But if you are new to Oracle, it will cost you in ramp-up time and purchase price. Oracle also has strong support for parallel processing — symmetric multiprocessing and Massively Parallel Processing — which makes its product very scalable.

With the acquisition of PowerSoft Corp., which owned Watcom database technology, **Sybase** now has a diverse product set that spans from its **SQL Anywhere** line to **SQL Server**. This gives customers a wealth of options to scale from single-user to departmental to very large database implementations. The firm's web.sql and NetImpact Dynamo products offer Sybase shops a strong means of personalizing intranet publishing with a minimum amount of programming effort, using embedded SQL and Perl statements within HTML pages.

Advertisement

Why Distribute LANE Services?



By Mike Kazar

The ATM Forum LAN Emulation standard requires the support of the hosts in the network and three network services: LAN Emulation Configuration Service (LECS), providing configuration information to the hosts; LAN Emulation Service (LES), providing MAC-level address resolution; and Broadcast and Unknown Service (BUS), forwarding broadcast traffic to hosts in an emulated LAN and limiting the amount of unicast traffic.

Although most LANE services today are implemented on a single machine, a distributed LANE Network-to-Network Interface (LNNI) solution has many advantages:

With a distributed solution, no single point of failure exists for an emulated LAN. If a member of a distributed LES or BUS crashes, clients of that service simply reconnect to another machine serving the same ELAN.

A distributed solution reduces the number of clients connected to any given server and as a result, the number of virtual circuits (VCs). When more than one LANE service is in operation for an ELAN, each host still connects to only one machine. This allows the VC load to be shared among all available LANE service machines.

Regarding multicast performance, LNNI can't reduce the load on the BUS, but it can reduce the VC load.

Finally, a good LNNI implementation restricts the number of machines, both hosts and services, that actually receive unknown traffic. Unknown traffic is traffic intended for one machine, but is sent via the BUS to all machines because a direct VC has not yet been setup.

Since all but one machine discards the unknown traffic, it is inefficient for those machines to receive and discard this data. An intelligent BUS identifies the intended machine by consulting the associated LES. In some cases, intelligent BUS optimization can reduce BUS loading.

The goal is to spread the load from the LANE clients as evenly as possible among the distributed LANE services. This makes it easier to add more clients without affecting performance and eliminates a single point of failure.

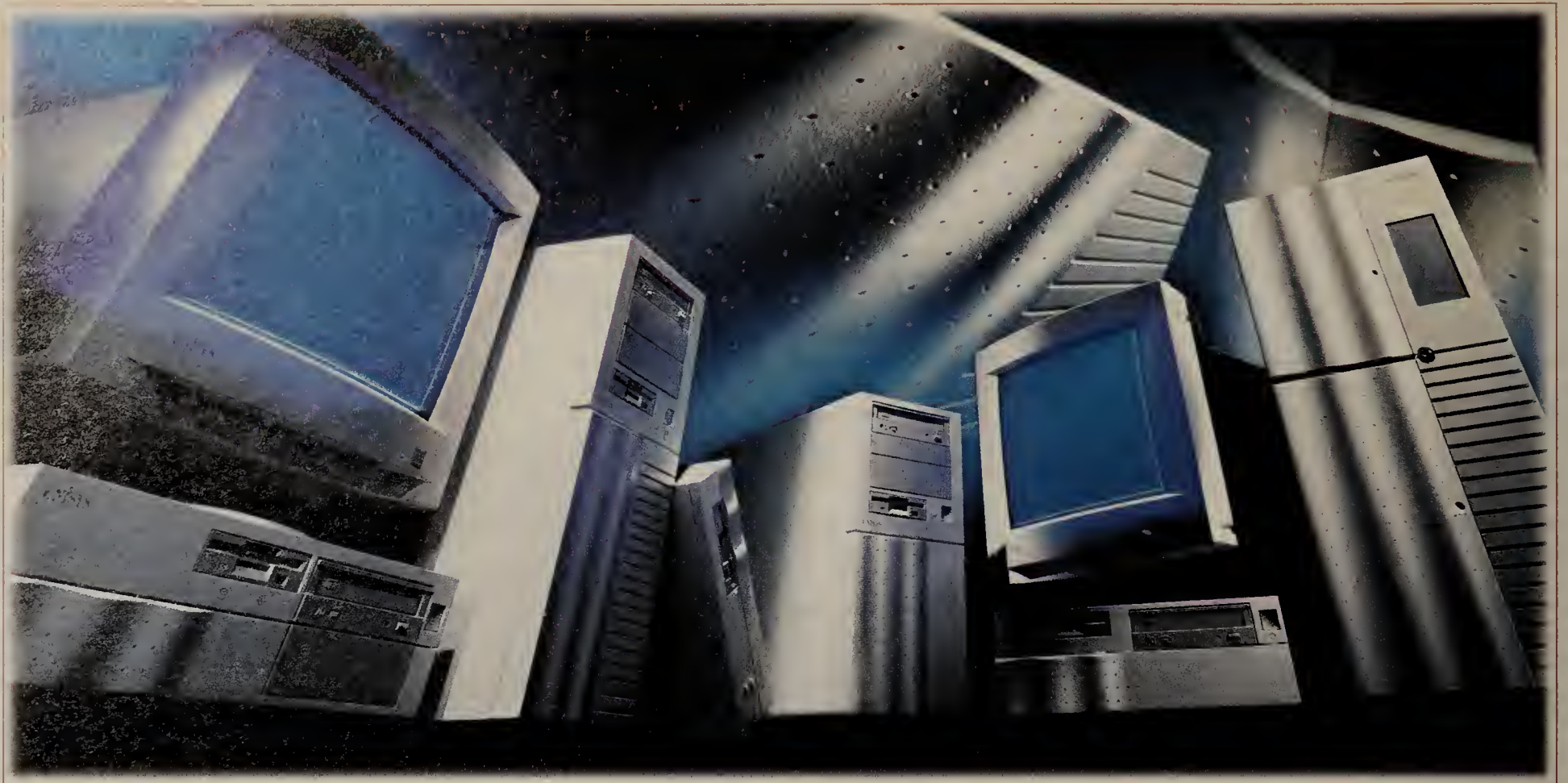
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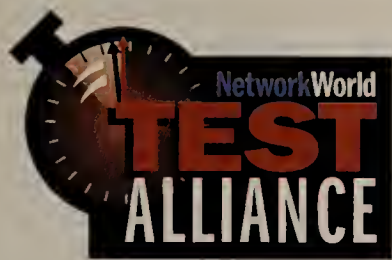
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When information is everything.



Naming the Best DNS for Windows NT

By Wayne Spivak

The Domain Name System (DNS) is like the foundation of a house — nobody gives it much thought, but without it the Internet would be on shaky ground.

DNS servers, generally running on Unix platforms, translate alphabetic domain names into numeric IP addresses and vice versa. Without DNS and DNS server, the Internet would look like `http://127.50.4.3/smile`, instead of the familiar `http://guide.sbanetweb.com`.

We tested five DNS servers designed to run on the increasingly popular Windows NT Server. Four are commercial products; one is freeware. Most have their roots in Unix's Berkeley Internet Name Domain (BIND) software. However, they vary greatly in terms of implementation, and their statistical and debugging features.

The best product in terms of overall ease of installation, documentation, configuration options and features is MetaInfo, Inc.'s DNS Server 2.1 for NT. Although more expensive than most of the others, it's suitable for everyone from the corporate DNS neophyte to the sophisticated Internet service provider. MetaInfo's DNS is sturdy and stable, lacking only certain display features that we found exclusively in the WinBind for Win 32 freeware.

A close second was Francois Beauregard Logiciels, Inc.'s (FBLI) DNS Pro 2.00. If it handled NT's Windows Internet Naming Service (WINS) database, which permits computer lookups similar to DNS on NT networks, it would have slipped into first.

At the other end of the spectrum was NetManage, Inc.'s IntraNet Server 5.1. During testing, we were unable to maintain the server in an operational state for more than a few hours at a time. In fact, after a fair amount of correspondence with NetManage's technical support staff and installing an update file, NetManage

These five Domain Name System servers fill a range of needs when you're connecting Windows NT networks to the Internet.

actually suggested we use a DNS server from another manufacturer.

All other products operated fine under NT 3.51 and 4.0 as both primary and secondary servers.

Configuration

The Internet's hierarchy is similar to that of a file system. On the Internet, instead of being called "root," the top level is called "." (dot), with the major branches called "com," "edu" and "org." Within each branch are the DNS equivalents of file system directories, called domains.

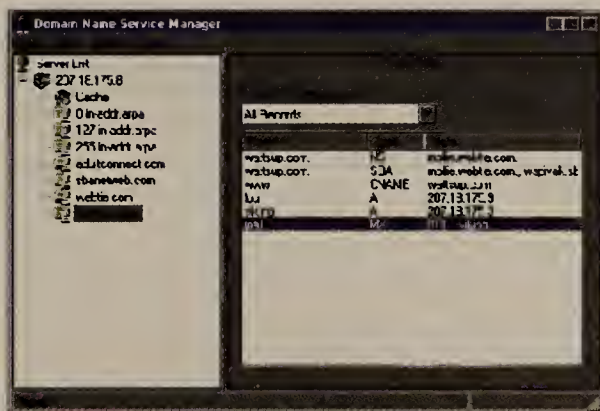


Figure 1: Microsoft's DNS server lacks tools for simplifying the creation of zones.

You can break a domain into subdomains, which reside on different IP networks. Each subdomain, or zone of the domain, is maintained by a different DNS server.

All DNS servers work with domains and zones. The information is kept in files called `db.<domain name>`. Unix DNS servers utilize text files. On NT, with WinBind and NetManage IntraNet Server 5.1, your only choice is to use a text editor. MetaInfo lets you configure your system to

use a text editor or a Web browser. (Microsoft Corp.'s Internet Explorer and Netscape Communications Corp.'s Navigator are the only browsers supported.) MetaInfo also provides the user with a graphical interface that has the ability to start, stop or pause the service. FBLI permits you to use a text editor or two graphical modes — one for beginners and one for advanced users. If you use Microsoft's DNS for NT 4.0 server, you must use the graphical window it provides, unless you're very skilled at DNS configuration.

The ability to create db domain files via text editors makes the creation of multiple zone files a breeze with WinBind, NetManage, FBLI (in the advanced mode) and MetaInfo (in the text editor mode). Multiple zone creation in the browser or graphical mode (with MetaInfo, FBLI and Microsoft) is slower but requires less familiarity with DNS internals. With FBLI's dual graphical modes, zone files can be created quite easily.

FBLI, Microsoft and MetaInfo all have the ability to create reverse mapping files. With these products, you don't have to continually go back to the `in-addr.arpa` file and add additional mappings each time you assign an IP address to a new host computer. This feature only works in the beginner mode if more than one mode exists.

We found creating zones with Microsoft's product to be a complex process (see Figure 1). The online help was not of any assistance, nor was the interface intuitive.

Both Microsoft and MetaInfo permit you to specify the local WINS database — an important issue for corporate users that run NT servers and workstations con-

nected directly to their Windows networks. With Microsoft's product, you specify the WINS database through the primary domain property dialog box. With MetaInfo's product, the information is entered through the DNS Control Panel, where you can map all NT worksta-

DNS glossary

Caching server: A Domain Name System (DNS) server that caches information but doesn't act as a primary or secondary server for any zones or domains. In large networks, a caching server limits the amount of traffic traveling outbound from your network.

Domain: The name for an Internet directory or partition — for example, `nww.com`.

Forwarding server: A DNS server dedicated to sending requests for information out of your network.

named.boot: The control file for the local DNS server that tells it which zones to load and what type of server it should be to those zones.

Primary server: Maintains all the information for all domains and zones within its span of authority.

Secondary server: A backup DNS server.

Slave server: A DNS server that utilizes a forwarder for all information not held in its zone files, rather than going out to the 'Net to find information on other domains.

Zone: The domain or a subset of the domain.

tions to a particular DNS domain. The actual records for all the workstations would be in the selected DNS domain and the WINS server.

NetManage could not read the files we ported from our Unix system, requiring us to rekey all the files. NetManage's technical support staff told us we would have to change Unix line feeds to the DOS version. Both WinBind and MetaInfo had no trouble reading the files.

A DNS server that isn't running does no good. WinBind is the only program that doesn't run as an NT service and, therefore, can't start automatically at boot time. We had to place WinBind in our

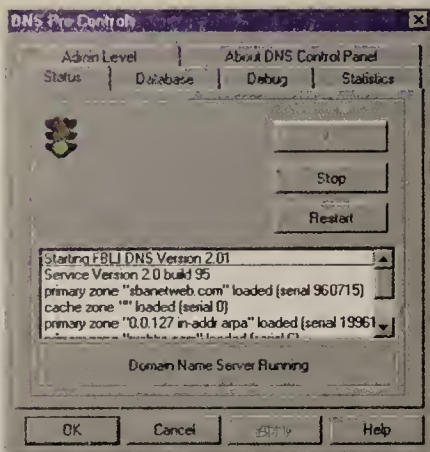


Figure 2: FLBI's DNSPro's Control Panel provides logging information that you can use for debugging.

Startup group, which at least triggers WinBind to begin as soon as we logged on. To make this automatic, we turned on the Auto Logon feature of Windows NT. Thus, we had to sacrifice security for functionality.

Working out the bugs

DNS software needs the ability to debug problems in the zone file because an improperly defined zone file

creates a slew of problems for the host and end user. For example, an incorrect entry could direct users to a machine that isn't configured to handle the desired service or to an IP address that doesn't exist. It may even send the user to oblivion if a par-

ticular service (E-mail, for example) isn't configured correctly.

All of these programs come with some type of debugging facility. WinBind had the best visual capabilities. With an option to log information to a file or send it to a display, you can watch virtually every data-gram sent to your DNS server. WinBind also provides database and statistical dumps.

FLBI's DNS server provides some operational display in the DNS Control Panel (see Figure 2), which can be used for debugging purposes. FLBI provides 10 levels of debugging, while MetaInfo has 12 (see Figure 3, page 55). The multiple debugging

levels allow you to specify by degree the amount of information you are going to wade through to find errors. Most times, lower levels suffice. Both companies show debugging messages in incremental fashion. However, all information is sent to a file that you can't examine unless you turn off your DNS server. While this may be inconvenient, a typical network setup has both a primary DNS server and at least one secondary server, so DNS is not interrupted during the process.

Microsoft provides statistics in its product's graphical window, plus other error messages in its cryptic event viewer. These messages were not specific enough to properly debug problems

ScoreCard

	DNS Pro 2.00	DNS 2.1 for NT	DNS for NT 4.0	IntraNet Server 5.1	WinBind for Win32
Overall score	8.1	8.3	6.5	2.8	5.8
Configuration 30%	7	7	6	6	6
Features 30%	9	9	6	2	7
Operation 30%	8	9	9	1	6
Installation and documentation 10%	9	8	2	1	1

Scores based on a scale of 1–10. Categories are weighted by the percentages shown.



NetResults

Product	DNS Pro 2.00	DNS 2.1 for NT	DNS for NT 4.0	IntraNet Server 5.1	WinBind for Win32
Vendor	Francois Beauregard Logiciels, Inc. (514) 349-0455 www.fbli.com	MetaInfo, Inc. (206) 521-2600 www.metainfo.com	Microsoft Corp. (206) 882-8080 www.microsoft.com	NetManage, Inc. (408) 973-7171 www.netmanage.com	Internet Software Consortium ftp://ftp.demon.co.uk/pub/ ibmpc/win95/network/winbind. zip
Price	Primary server: \$250 Secondary server: \$70	\$400 for a license for one primary server and up to four secondary servers	Included in Windows NT 4.0	\$495	Freeware
Pros	<ul style="list-style-type: none"> Has beginner and advanced dialog boxes for data entry Automatically creates reverse mapping entries 	<ul style="list-style-type: none"> Has text editor or browser interface Excellent documentation 12 levels of debugging information available Good remote administration 	<ul style="list-style-type: none"> Can't beat the price Perfect for the corporate user Graphical user interface Good remote administration 	<ul style="list-style-type: none"> Packaged with NetManage's NNTP, NFS, Web, LDD and time servers 	<ul style="list-style-type: none"> Can't beat the price Graphical user interface shows all statistics
Cons	<ul style="list-style-type: none"> Nomenclature and grammar need some improvement (mainly because it seems to be a translation from French) Two icons make controlling the server a little cumbersome 	<ul style="list-style-type: none"> Most expensive of servers tested Can install browser or text version, but not both 	<ul style="list-style-type: none"> Extremely labor-intensive to create multiple zones No database dump Poor documentation 	<ul style="list-style-type: none"> Product unusable, thanks to repeated shutdowns after several hours No DNS statistics or database dumps available Cryptic error messages No documentation 	<ul style="list-style-type: none"> No documentation Does not work with WINS Is not an NT service

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that might be created by errors in the zone file. Equally annoying was NetManage's approach, which also shows errors in cryptic language only in the event viewer. The ability to have a file dump all debug information would have enhanced our ability to fix errors. NetManage has no statistics facility.

Administration

Administration of the DNS server is handled differently by each product. With MetaInfo (in text mode) and WinBind, changes to DNS require you to modify the zone files, and possibly change named.boot, which tells DNS what type of server (primary, secondary, caching, slave, forwarding) it is, where to find the database files, how to load them and so on. WinBind also permits some remote administration by creating a file in the Windows

subdirectory that permits you to reload the database and control debugging levels.

To modify a zone with NetManage, you need to change the database file. To make a new zone, you create a new database file, and add an entry into the registry to signify that the new zone needs to be loaded (instead of the named.boot file). With Microsoft's DNS server, you have to access the computer with the administrator's account.

FBLI is unique in that you specify the database directory (the first line of the named.boot file), and it keeps track internally of primary and secondary domains. The named.boot file tells the DNS server what zones to load and whether it should be a primary or secondary server. This can be quite a time saver. Unfortunately, FBLI in its beginner mode does not permit forwarding, slave or caching servers.

Remote administration gives you the ability to make changes to a DNS server from another workstation. MetaInfo is the only product that provides a remote administration feature, but it only works when you have MetaInfo's DNS server configured for browser mode. With it, you access the correct URL and make additions, subtractions and corrections.

Find resources for setting up your own DNS server. Enter the number to the right in the DocFinder box on the home page.

<http://www.nwfusion.com>

MetaInfo also gives you a level of security regarding who is able to make changes — not only by password-protecting the remote administration feature, but by locking in or out specific incoming IP addresses.

A unique feature permits MetaInfo's technical support staff, or any configured IP address, to access your DNS server across the Internet. We'd probably keep this feature turned off most of the time because hackers using IP spoofing to falsify their IP address could make the network think they were trusted parties.

ISPs and corporate users have different needs

Two kinds of users need Domain Name System (DNS) servers: corporate customers and Internet service providers. Certain features in some of the products, such as the ability to clone zone files, make them more suitable for ISPs and require users to have a greater understanding of DNS.

Corporate users have a relatively limited number of DNS zones and generally less experience in configuring DNS servers as compared to their ISP counterparts. So they need a DNS program that's easy to configure, with a graphical or browser interface.

— Wayne Spivak

sify their IP address could make the network think they were trusted parties.

Installation and documentation

All of the products are quite easy to install, though some (Microsoft, NetManage and WinBind) ask only a few questions while others (MetaInfo and FBLI) are more inquisitive.

Documentation is a different matter.

WinBind comes without documentation, save for some command-line arguments. Interpretation of error messages and database dumps is left as a challenge for the savvy DNS administrator.

NetManage comes with a poorly written manual only a few pages in length.

Microsoft's only manual is an online help file that, for the most part, refers the reader to *DNS and BIND* from O'Reilly & Associates, Inc., the de facto Bible for these products. It lacks details about its cryptic error messages.

Also online, MetaInfo's manual is comprehensive, providing information about DNS, configuration and troubleshooting.

FBLI has a unique graphical hyperlinked manual that answered most of our questions. It also provides all the requests for comment that relate to DNS, making the documentation all-encompassing.

Conclusions

If you have only a couple of zones to manage, you'll be well served by either WinBind or Microsoft's DNS server.

Those with a limited budget and many zones should consider a hybrid system. Combine WinBind as a primary DNS with Microsoft as a secondary to get the right balance of easy configuration and service at no cost.

If you have larger requirements and budgets, consider FBLI's or MetaInfo's products. Both are stable, easy to work with, full of useful features and priced similarly.

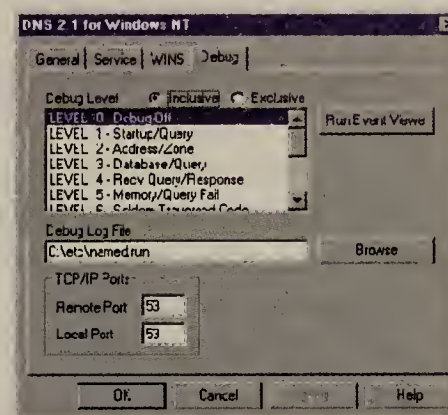


Figure 3: From MetaInfo's control panel, you can set 12 levels of debugging information.

The alliance is a cooperative of users, consultants, educators and integrators that applies its technical and business skills to analyze and compare strategic network products. A list of alliance partners can be found on page 68.



Spivak is president and owner of SBA Consulting, an information technology consultancy, and SBA.NET.WEB, an Internet consultancy. He can be reached via E-mail at WSpivak@sbanetweb.com.

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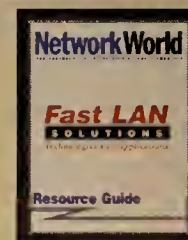
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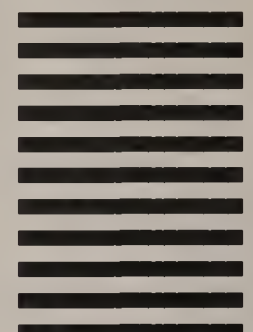
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HEAD-TO-HEAD

VonRumpSchradder

For Internet services, are you better off going with a traditional carrier or a company dedicated to providing Internet services?

BY STEPHEN VON RUMP

Not so long ago, providing Internet service was simply about access. It was about making the vast resources of the World-Wide Web available to business users — a great information service for employees, but not exactly a critical business application.

That has changed. Internet technology now is a strategic IT weapon, one that can dramatically improve communications across a business enterprise and deliver efficient ways of reaching and serving customers. And getting Internet service from a so-called traditional carrier is the best way to ensure that your business can take advantage of that technology.

Today's telecommunications carriers are anything but traditional. Most have expanded their product and service portfolios to become a single source for meeting users' growing demand for integrated business communications solutions.

Internet service providers can't address your total communications needs as your enterprise is about more than the 'Net and its associated technologies. Unless Internet services are integrated into an overall enterprise solution, you'll miss out on the applications that make your firm more competitive.

Take, for example, corporate intranets. Carriers provide you with the full range of services required for building intranets from legacy systems — from 'Net transport, Web site creation and hosting, to systems integration, consulting and network management — while protecting your previous network investments. It is often a customer's carrier partner that helped build the legacy systems, making carriers ideal to help customers migrate to an intranet environment. The simple fact is that intranets are not built in isolation; they should be integrated with existing nets that include everything from private lines and frame relay to managed services.

Additionally, carriers offer volume discounts and a single point of contact for customer service supporting an integrated communications solution. These are only some of the advantages carriers have over straight ISPs.

While many ISPs claim to have global reach, few provide it on a truly seamless basis. But many carriers can leverage global alliances to offer a worldwide Internet backbone with consistently high levels of network performance. For example, MCI Communications Corp. and BT are building Concert Internet-Plus, a global Internet backbone to be linked by 20 superhubs worldwide.

Traditional carriers are also network experts with Internet service that runs end to end over their own state-of-the-art network facilities. As a result, carriers can quickly add capacity as their businesses grow and their customers' requirements change. MCI, for example, has initiated two major upgrades this year, investing \$60 million since June to increase the speed of its Internet backbone to 622M bit/sec by year-end. Customers also benefit because of the direct control carriers have over the cost elements of their networks, which will enable them to continue to pass savings on to their customers as the industry matures.

Customers relying on ISPs for Internet services are unnecessarily adding another layer to manage within the overall enterprise net scheme. The Internet market is highly competitive, and there will always be a role for ISPs providing specialized applications and serving niche markets. However, only a traditional carrier can deliver the full portfolio of services, interoperability and network-based computing platforms that comprise the kind of enterprise solution you need to compete in an increasingly information-driven marketplace.

Von Rump is MCI's vice president of enterprise marketing. He can be reached via the Internet at Stephen.VonRump@mci.com.

BY WILLIAM SCHRADER

Traditional carriers will fail as Internet service providers if quality matters to companies using the Internet.

Telephone companies know less about the Internet than any ISP, offer low-quality products over light-duty networks and entered the market late — with the wrong team. In many cases, carriers simply don't know what's going across their networks, be it voice or data.

In contrast, dedicated ISPs are architecturally optimized for the Internet,

which was invented by computer people. It owes more to the culture of silicon than to the culture of fiber and is more about distributed computing than broadband digital communication.

While traditional carriers know how to build and deliver bandwidth, they incorrectly assume that 'Net application performance responds to more T-3, OC-12 or ATM. They don't understand that the Internet exploits the capabilities of silicon in the net servers at its periphery and in the routers spread throughout its interior.

It is TCP/IP that optimizes the bursty, mixed-media application exchanges among hundreds of thousands of sources and destinations. And optimizing a net for Internet performance is different

from building a generic broadband platform that, in order to justify its enormous cost, must carry a wide range of applications with often-conflicting performance demands.

The key to optimizing Internet applications is to tune the system so that few packets are lost and need to be retransmitted. This is accomplished by carefully managing router buffers, distributing the servers to spread traffic across the network and cautiously balancing network components. All of this is tied together with SNMP-based monitoring tools to make up the largest, most sophisticated distributed computing system ever built — the Internet.

Internet traffic behaves differently from voice traffic. So attempts to run both over the same net can lead to significant performance degradation for either or both types of traffic. Moreover, this fundamental technical incompatibility means indiscriminate traffic mixing has a less substantial economic benefit than the sharing economies routinely enjoyed by today's Internet users.

The limited economies of shared broadband platforms are likely to be reflected in higher costs to their users. Where synergy among users is limited, pricing must be based strictly on usage. Internet pricing is flat rate because it would cost more to measure, record and invoice usage than could be collected in revenue. Rather than dreaming they can eliminate the flat-rate model, carriers should convert to flat-rate, long-distance voice service.

If quality matters to firms using the Internet, the commitment of providers to world-class 'Net services is a critical factor. For carriers, the driving force seems to be retaining long-distance voice market share. Giving away inferior Internet service to reduce long-distance customer churn will become popular with regional phone companies, as it has with AT&T and MCI. True ISPs are better able to understand and deliver on the needs of 'Net users, and providing mission-critical, desktop-relevant Internet services is their focus.

Traditional carriers participate significantly in the 'Net industry by providing bandwidth and dial tone at a high profit margin. They would do shareholders, the rate base, government regulators and customers a favor by remaining phone companies, rather than failing again to deliver anything other than dial tone.

Schrader is chairman, president, chief executive officer and founder of PSINet, Inc., a nationwide ISP in Herndon, Va. He can be reached at schrader@psi.com.



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Briefs

■ **Productivity Point International (PPI) and QUE**, a division of Macmillan Computer Publishing, have produced the **Microsoft Certified Professional Windows 95 Exam Guide**.

The first in a series of Microsoft Certified Exam guides, the book is designed to help you study for Microsoft Corp.'s Certified Professional Exam #70-63 and can be used to supplement hands-on classroom training.

The book sells for \$99 and is available at all North American PPI locations and national retail outlets. The ISBN number is 07897-0744-6.

PPI: (800) 848-0980.

■ **International Network Services** has unveiled a network security services portfolio. The program will provide support in the following areas:

- Internet/intranet requirements and security policy development
- Perimeter security design
- Firewall implementation
- Server workstation security
- Testing and certification
- Client training and knowledge transfer

INS: (617) 376-2450.

The lowdown on CNE study guides

By **Connie Sloane Brown**

You say you don't have the time or money to attend test preparation classes that will prepare you to pass Certified Novell Engineer (CNE) exams? Don't worry, there are a number of self-study guides that can do the job for less, often much less, and you can do them on your schedule.

We had a CNE use seven self-study products and identify the five that will best prepare you for Novell certification.

We highly recommend the CNE Testing Guide Series, published by Pisces Press. In a survey we did in conjunction with this review, this series was voted the No. 1 aid by Novell Authorized Education Centers, Novell Academic Education Partners, CNEs and Certified Novell Instructors (CNI). The survey also found that after using the guides, 71 of 77 respondents passed the exam on their first try.

"After I failed three tests, I passed the first time when using the guide," says Joe Ferro, a CNE candidate out of Rochelle Park, N.J. Each of the eight books in the series retails for \$19.95 and consists of a multitude of questions and answers, objectives, summaries, sample tests and

other supplementary tools. Each guide is written in direct support of Novell's CNE Study Manual. Three more guides will be added to the series early next year.

Another highly rated offering is the Windows-based Big Red Self Test program from Self Test Software, Inc. The menu-driven package gives you easy-to-comprehend questions that you will likely find on a CNE exam

the Novell CNE Study Manual that contain background material. Each practice test averages 300 questions and gives you a set amount of time to answer them. The typical CNE exam has fewer than 100 questions. Supported by Novell, the Big Red Self Test is moderately priced, starting at \$84 for a CNE 4.1X Starter Pack that includes questions related to material in four CNE courses,

component locations, configurations and other hardware technical information for NetWare. With this package, you get hands-on training that covers actual situations you might encounter using NetWare.

You can invite an instructor into your living room by plopping the NetWare 4 CNE Videos from ViaGrafix in your VCR. Each tape includes a full-length, instructor-led course that is easy to comprehend. The tapes include built-in pauses that let you practice what is covered after

CNE study guide product details

Company	Wave Technologies International (800) 828-2050	AllMicro (800) 653-4933	Pisces Press (757) 486-7602	Self Test Software (800) 244-7330	ViaGrafix (800) 842-4723
Product	CNE Study Guide/CNE Challenge	CNE Self Study Course	CNE Testing Guide Series	Big Red Self Test	NetWare 4 CNE Videos
Contents	Two books, two 3.5" disks, one CD-ROM	CD-ROM and user's guide	Book	3.5" disk	13 VHS videotapes
Equipment requirements	Windows 3.1 or better, 2M bytes of RAM, 5M bytes of hard disk space	80386 or better, Windows 3.1 or better, 2M bytes of RAM, CD-ROM, VGA card and monitor	None	80386 or better, Windows 3.1 or better	VHS VCR

administered at Authorized Prometric Testing Centers (APTC). However, it does not provide basic CNE training materials.

To help you learn from mistakes, the Big Red Self Test gives you the answers to questions you miss and tells you the pages in

and at \$133 for the CNE 4.1X Full Pack that pulls questions from seven courses.

If you want a combination of books and CD-ROM software, we found the CNE Study Guide/CNE Challenge from Wave Technologies International, Inc. helpful. The \$199 package offers the full spectrum of study material beginning with two books that form a concise study reference. It provides timed tests much like those given at APTCs and in the Big Red Self Test.

Wave's offering keeps track of your test scores, tells you how long it took you to complete each test, and enables you to answer questions randomly or sequentially. This study course was written with input from more than 50 CNEs and CNIs covering 15 CNE tests for both NetWare 3.X and 4.X with five CNE electives.

The CNE Self Study Course from AllMicro, Inc. is another good example of computer-based training because of its use of NetWare simulation. Supplied on CD-ROM, the \$1,499 package has modules for all CNE courses and comes with AllMicro's Micro House Technical Library, which includes the latest specifications, diagrams, hardware settings,

each segment, if you have a NetWare server setup where you view the tape. A package of 13 tapes covering NetWare 3.X and 4.1X is reasonably priced at \$599.

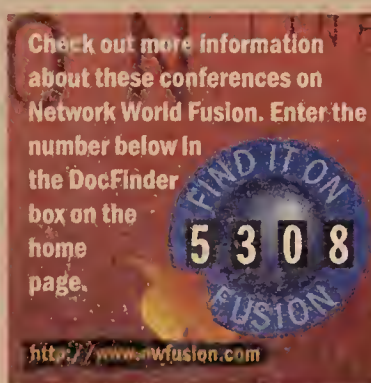
Any of these study guides can help you pass a CNE exam on the first try and, given the \$85 exam fee, at least two of these packages pay for themselves if you don't have to retake the test. Even the packages with hefty price tags can be worth the investment as having the CNE label on your resume could get you noticed by potential employers.

Brown is a freelance writer in Virginia Beach, Va., and author of the forthcoming book *How to Hook a Big Job With a Little Fishing Pole*. She can be reached at Sloane3959@aol.com or (757) 486-7624.

CONFERENCE PLANNING

CONFERENCE: RSA Data Security Conference
WHEN: Jan. 28-31, 1997
WHERE: San Francisco
SPONSOR: RSA Data Security, Inc.
CONTACT: (415) 544-9300

The City by the Bay hosts this year's show for computer security and network professionals who want to learn the latest on how to keep their communications private and authenticated but still easily accessible to authorized users. Tracks include sessions covering topics such as Domain Name System security, X.509 Version 3, security for interactive broadband cable services, and security protocols and standards.



The conference costs \$995 if you register by Dec. 31; after that it costs \$1,295.

CONFERENCE: Networks Expo and Internet+ Intranet Expo I
WHEN: Feb. 17-20, 1997
WHERE: Boston
SPONSOR: Blenheim Group USA, Inc.
CONTACT: (800) 829-3976, Ext. 9585

Old-timer Networks Expo dovetails with the new I² Expo that will focus on using Web technology to build corporate applications. New events at the show include the I² Expo Home Page Awards for outstanding intranet design, the Upside Intranet Forum where you can learn about the future of intranets, the ISDN Pavilion where you can see demonstrations of advanced applications such as teleconferencing, and the Web Development Tools Center.

Conference packages that get you into both shows cost \$395 to \$1,195. Tutorials cost \$250 to \$595, and exhibit-only registration is \$75.

Download a chart listing the pros and cons for each of the five CNE study guides covered in this article.

Type the number above in the DocFinder box on the home page.

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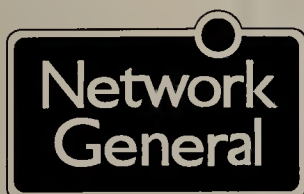
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You will design and present classes on LAN technologies and protocols. You must have at least 3 years of customer technical instruction and course development experience. Your background may include customer technical education, hands-on network troubleshooting, or LAN consulting. Excellent presentation skills are required. Extensive knowledge of LAN/WAN protocols is also required, as well as a willingness to travel (at least 50%). CNX certification is desirable. This position is based in Woodbridge, NJ.

Network General Corporation offers an excellent compensation and benefits package. To apply, please send your resume, indicating position of interest, to NGC Employment Department NWW1, 4200 Bohannon Drive, Menlo Park, CA 94025. You may also fax your resume to (415) 321-0854, or email (ASCII only): career@ngc.com. (When faxing your resume, please use white paper with 12 point black font. Please refrain from using bold type, underlining, italics, or non-standard typefaces.) EOE. Visit NGC's homepage at <http://www.ngc.com>. Principals only, no phone calls, please. Sniffer is a registered trademark of Network General Corporation.



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Individual should possess 5+ years of experience managing UNIX systems, preferably running Solaris 2.5. Overall, 5-9 years of experience which includes both Local Area Network and Wide Area Network with more than 100 end users. Informix database experience a definite plus. Experience must include all aspects of systems administration including capacity planning, disaster recovery planning, and UNIX system configuration. Customer service skills a must since response time must be ensured. Work with network group to ensure proper network support infrastructure. BS (or equiv. experience) required; Master's a plus. SAP experience helpful.

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Configures Windows NT desktops and servers, provides customer support to end users, and works to define configuration standards and administration procedures. Experience as an NT administrator and 3-4 years providing customer service in an information technologies environment are required. ASCS (or equiv. experience) with Netware, UNIX and/or IP a significant plus.

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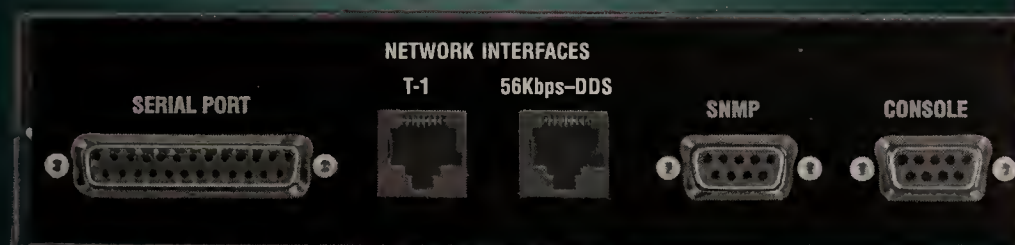
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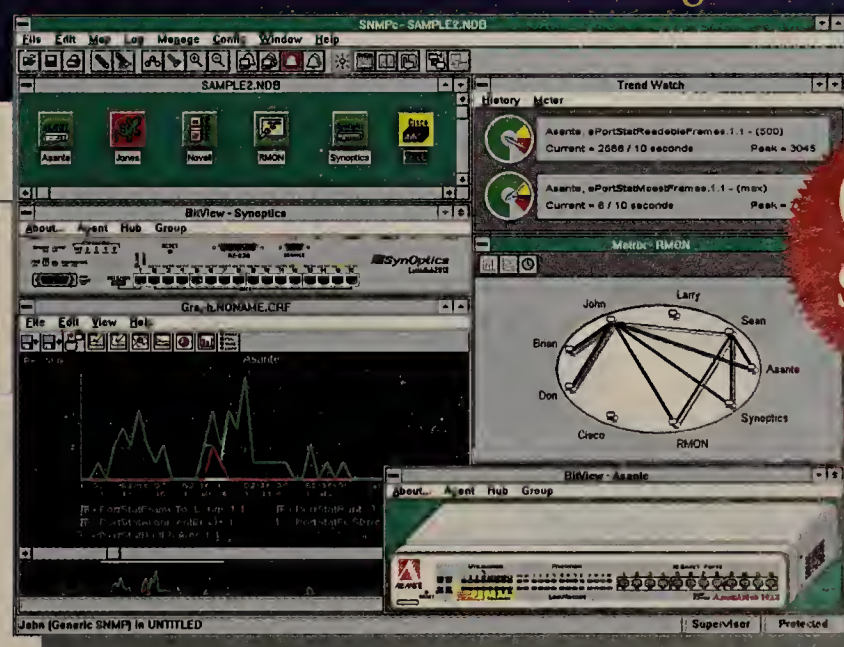
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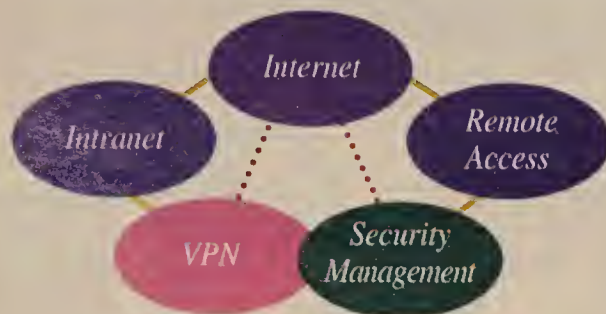
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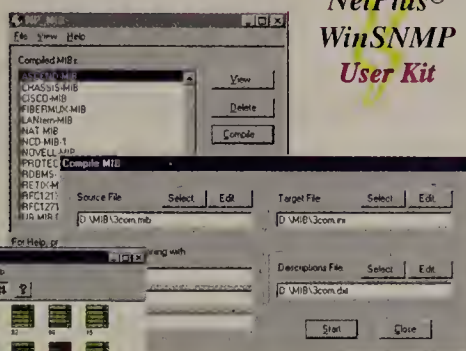
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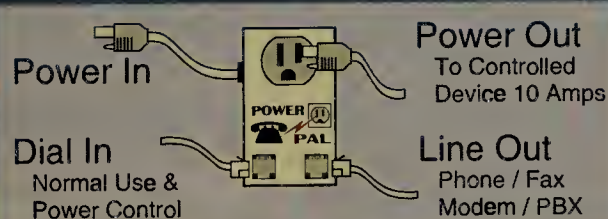
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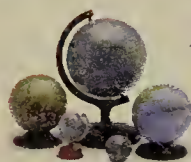
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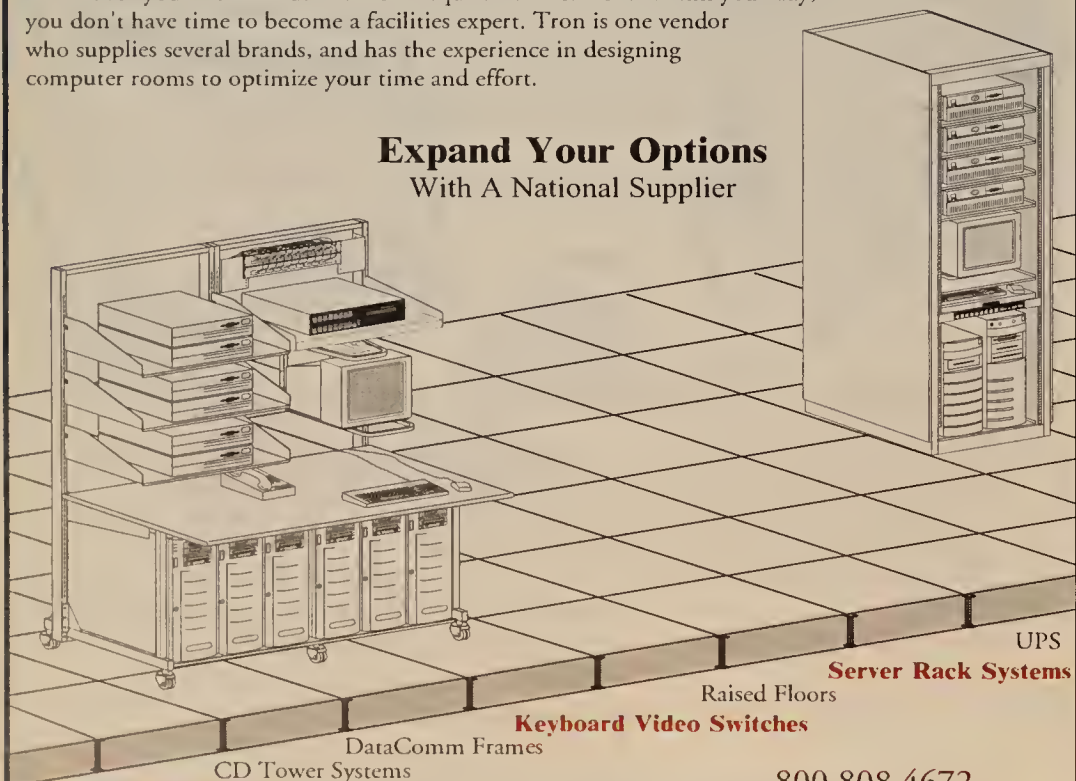
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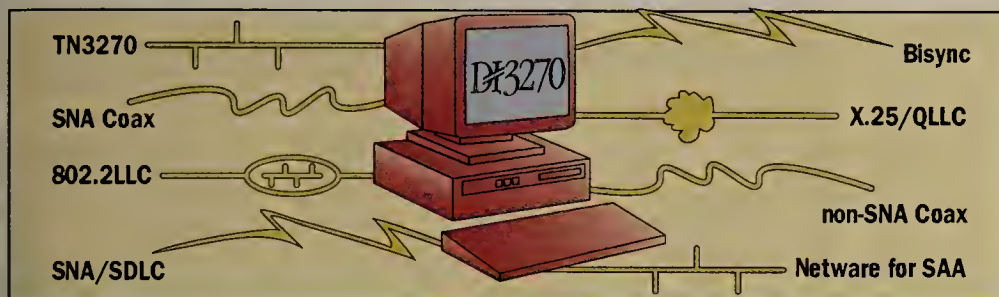
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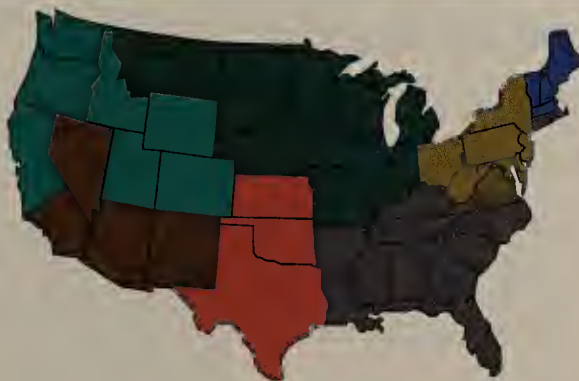
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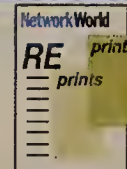
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Java

Continued from page 1

"Things worked fine with the Netscape Java-based Navigator Version 2.0 for Windows 95, but it didn't work on the Apple at all," said Instant Sports President Tom Fornoff. Netscape Navigator 3.0 for the Macintosh does not seem to handle Java applets well at all. Netscape acknowledged a number of bugs and said it is working hard to fix them, but declined to provide specifics.

Microsoft, meanwhile, is entering the JVM fray, proclaim-

ing that it would make its JVM, which already runs as an ActiveX control, available as a plug-in for Netscape's browser.

In fact, a random survey of developers indicated that problems have been fewer with Microsoft's JVM.

But developers used to Windows may not always pay attention to multiplatform details.

"In one sense, what Microsoft is doing is making development for Java on Windows very, very

easy," said Mark Lussier, chief architect with Sanga International, Inc. "But on the other hand, when you get all done with your creation, it will only run on Windows. . . . It sort of defeats the purpose of what Java was supposed to be."

Another downside? Some developers have tended to get sloppy, knowing that their applications will run on Windows, Lussier said. Sanga has taken to

doing its testing on SPARC because it has found if an application works there, it works everywhere.

Microsoft agreed that developers must write their code carefully. "Developers who are interested in cross-platform still need to test their applications cross-platform," said Microsoft product manager Charles Fitzgerald.



Sun's Spenhoff says, "We're focusing on improving the product and performance of the JDK."

Westborough, Mass.-based Applix, Inc., which has created the Anywhere family of Java applications, has also seen the browser problems firsthand. Because Microsoft, Netscape and even Sun all have different implementations of the JVM in their browsers, Applix has taken to putting code into products to recognize which Java browser is being used so it can render the best performance.

"Netscape on Windows works differently from Netscape on Unix boxes," said Barry Burke, Applix director of Anywhere product development. "They're two different JVMs. And it's the same with Microsoft. The Microsoft Explorer has two JVMs — one for Windows NT and 95, and the other for the Macintosh," Burke said.

Sun's JavaSoft division

acknowledged the Java compatibility problem when it announced the release of a new version of the Java specification, the JDK 1.1 (see story below). But executives were careful not to mention names.

"I know there's been a lot of frustration and disappointment around compatibility," said David Spenhoff, JavaSoft director of product marketing. To combat the problem, JDK 1.1 is expected to ship with 5,000 conformance tests for the JVM, the Java byte-code compiler and the class libraries. By contrast, JDK 1.0 had only 50 conformance tests.

From Sun's viewpoint, the Java licensees — of which there are now 55 — must take it upon themselves to

make sure their products pass all these conformance tests, with no outside approval process.

And that is the way it is going to remain, said Jon Kannegaard, JavaSoft vice president of software products.

"We have the right to audit if someone's getting squirrely out there, but we haven't felt the need to do that yet," Kannegaard said.

A number of developers and analysts, on the other hand, see a need for change.

"Sun really has to step up to this," Rymer said. "It's their technology. They own it. They license it."

Ted Young, president of New York-based Advanced Web Technologies, Inc., said Sun should play a stronger role in conformance testing because problems are getting out of hand. "People are discovering bugs in the implementation of the JVM in these browsers," Young said.

"To me, it's a bug if I can run it in an applet viewer, the tool that comes with the JDK, but it doesn't run in the browser."

Microsoft and Sun are also talking about the possibility that, somewhere down the road, they will come out with Java native-code compilers that would eliminate the need for a virtual machine entirely.

Spenhoff said the advantage of a native-code compiler for Unix, Windows or another operating system is that it would run Java applications faster than a JVM. But it would render Java byte code as something platform-dependent, negating the yet-to-be-fulfilled promise of "write once, run anywhere." ■



Applix's Burkes says, "Netscape on Windows works differently from Netscape on Unix boxes."

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JavaSoft formally launches JDK 1.1

Sun Microsystems, Inc.'s JavaSoft division this week plans to make available the beta version of the Java Development Kit (JDK) 1.1, with a final ship date of first quarter next year.

Acknowledging that developers have scorned the lackluster graphics design features of version one of the product, Jon Kannegaard, JavaSoft vice president of software products, promised a far better Abstract Windowing Toolkit (AWT) in this version.

JDK 1.1 will also have an international flavor to let developers create applets for foreign languages, especially Asian ones.

As expected, JDK 1.1 will add support for a proprietary Sun technology called the Remote Method Invocation, designed to let Java software objects communicate efficiently over networks.

JDK 1.1 also adds the Java Database Connectivity Standard, which provides a common way to access SQL databases through Java.

Although Sun had wanted to include encryption APIs with JDK 1.1, it dropped that plan under pressure from the federal government's National Security Agency, which indicated it would block the export of any JDK with powerful crypto APIs. However, JDK 1.1 will ship with digital signature technology that lets applets be identified through signing, a feature many companies have requested to expand use of Java in a secured way.

Java licensees that create Java development tool kits, and any software running the Java Virtual Machine, such as a browser or operating system, will have to ensure their products pass conformance tests that are part of the JDK 1.1, Kannegaard said.

The JDK 1.1 will have 5,000 different Java compatibility tests, as opposed to just 50 tests in the JDK 1.0.

David Spenhoff, JavaSoft director of product marketing, acknowledged that Java interoperability has had some problems. But he said Sun would prefer not to play an enforcement role, leaving vendors to perform their own testing.

Separately, JavaSoft will also be shipping an electronic commerce software developer's tool kit for creating Java-based cyberwallets.

—Ellen Messmer



JavaSoft's Kannegaard

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Gibbs gets a new vacuum, and ponders life, the universe and complexity

The biggest problem with most brands of vacuum cleaners is they are just not durable. You buy one for anything from \$200 to \$600, and the darned thing lasts about two years — if you're lucky.

So, what do hotels use? They use a brand called Kirby. You've probably seen them — they look a bit old-fashioned, with a rather 1940's utilitarian look. There's nothing particularly notable about a Kirby from the outside. But they are indestructible, have an incredible life-time warranty, and they work.

A friend said we should check one out, so my wife set up an appointment. (Kirby only sells direct.) I arrived home from a meeting to discover the salesman, Chris Hicks, vacuuming like a maniac. The coffee table was covered with filter papers of the stuff he'd vacuumed from our carpets, which had just been vacuumed that morning. Amazing. And disgusting.

We now own a Kirby. ... all \$1,400 worth.

"Gibbs," you may be saying, "you're crazy to spend that on a vacuum cleaner. And what does this have to do with networking, computers or anything covered in this august journal?" (Editor's note: Took the words right out of my mouth.)

My point about the Kirby is that it is "fit for purpose." It does what it's supposed to do, and it does so reliably and durably. It's the kind of thing you plan to have forever (or at least until death do part us from our household appliances).

Can we say such a thing about our computer systems? Nope. What about our internal networks, intranets and public Web offerings? Don't make me laugh.

Why is this? Because, compared to a vacuum cleaner, all of these computer things are orders of magnitude more complex. This results in more "gotchas" than a managed health care scheme.

Is there a way out of this? No. The complexity of computer software and systems will continue to increase probably at the rate of Moore's Law squared. (And remember, Moore's Law says that processors will double in speed every 18 months.)

Compared to vacuum cleaners, all of these computer things are an order of magnitude more complex.

The consequence of this is our systems are unstable and will tend to become more so.

This doesn't mean that they will completely implode. While that will — and does — happen, the increasing complexity results in far more minor, localized failures that have a far more significant impact on system reliability.

Look at the Internet. The great collapse predicted by Bob Metcalfe hasn't happened yet. And the fact is that it won't happen.

But that doesn't mean we're in the clear. We can already see that, in a very important sense, old Bob is right: The Internet is suffering from countless minor collapses every day.

We already deal with this fragility by backing up our systems and, in more sophisticated circles, creating redundant subsystems. But it's not enough.

In the future, you're going to have to design "hot" redundancy (automatic, real-time failure handover) into your networks in a far more profound way than you do today.

But just consider what you'll need to sell to management: "Our systems are likely to get more fragile, unless we really get the funds and the opportunity to engineer them against failure, and even then, we can only do our best."

It's a hard sell and in some ways may sound like we're admitting defeat. We're not; it's a pragmatic position. After all, it's not like we're dealing with Kirby vacuum cleaners.

How fragile are your systems? Drop me a note at mgibbs@gibbs.com, or call me at (800)622-1108, Ext. 504. Oh, and if you want to get one of these amazingly cool vacuum cleaners from Kirby, page Chris Hicks at (805) 518-0670.



Mark Gibbs

Technology is no panacea to storage mgmt. fiascos

You know the fun of PC networking is over when the mainframe jocks start improving our lives.

Take backup and storage management, for instance. Big guns such as Computer Associates International, Inc., EMC Corp. and IBM are moving their expertise into the Windows NT enterprise storage management arena. Their mantra: What's good for MVS and Unix is good for NT.

Network and IS managers are supposed to feel good about this development. You know, more data safety brings peace of mind and all that. Better technology is a good thing, but it is not always a cure-all.

Years ago, back when computers filled huge rooms, an associate told me about a guy who had a rush job for a high-profile consulting project. His goal was to process a complex statistical survey analysis on the mainframe.

In those days, you had to code data on punch cards, which were the computer's input mechanism. Each record required one punch card. Punch cards were

Unfortunately, the tape was unusable because someone had written over the first part. No problem; just requisition the other tape located off-site and reload the file from that source.

Bad news. The storage site manager said a water pipe feeding the fire extinguishing system had burst. The flood destroyed a section of the tapes. My associate's tape was in that section.

Refeeding the punch cards was the last resort. But someone had dropped them, spilling thousands of cards all over the floor. Putting them back into linear order was nearly impossible because the dot-matrix numbers were too faint to read. The team had three options: sort the cards, rekey the data or abandon the project. They gave up and hit the beach.

Now I keep my most recent corporate backup tapes in a bank vault. I figure if the bank loses those, it will probably have also lost my money. Might as well make it a real tragedy. Besides, there is no beach in Atlanta.

More Greek trivia

My recent column on the etymology of computer-related size descriptions triggered a "kilonerd" of responses. Several linguists correctly noted that terabyte is a trillion bytes, not a quadrillion, as I said. The president of Terabyte Computers was particularly miffed at my gaffe.

Alert readers also spotted a typo: petrabyte should have been petabyte. *Petra* actually is Greek for rock, several of which had clearly swamped my brain when I typed this egregious error.

The higher ranges of exabytes, zettabytes and yottabytes confused others. One reader asked, "Do they *really* exist?" Another answered, "Yes," noting that the Internet Society is measuring quarterly 'Net traffic in zettabytes. That reader wrote that the first-quarter Internet volume for 1997 is projected at 6 zettabytes, "more traffic than was ever transmitted in the previous 200 years."

Hmm. Maybe a Library of Congress search through backup tapes of E-mail traffic between the Founding Fathers will clue us in to what they were *really* thinking when they started this country.

Buerger is a networking industry consultant and writer in Atlanta. He can be reached at dave@buerger.com.



Dave Buerger

Data safety brings peace of mind. Better technology is a good thing, but it is not always a cure-all.

stacked in precise order, then fed into the mainframe for processing.

We hated rush jobs because coding clerks were usually off playing at the beach. That meant the researchers had to slave over keypunch machines. Big jobs could take days of this mind-numbing drivel.

After the survey information was encoded and entered into the mainframe, it existed in five places: the original survey response forms, the punch cards, on the mainframe and on two backup tapes. Tapes were kept in the computer center and in off-site storage.

You would think that five storage formats provided adequate security. Well, guess again. The mainframe crashed and destroyed the data file. No problem; just reload it from the backup tape.



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